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Lutein Cysts in Association with Vesicular Mole and Chorio-Epithelioma ;

A CONTRIBUTION TO THE STUDY OF THE NORMAL AND ABNORMAL PROCESSES SEEN IN THE DEVELOPMENT AND RETROGRESSION OF THE CORPUS LUTEUM.

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I. CORPUS LUTEUM CYSTS.

IN working out the development of these cysts it is necessary to follow as closely as we can the stages of the maturation of the Graäfian follicles and of their retrogression after the rupture of the yellow body. Inasmuch as the latter is the simpler task of the two, I will consider it first. After the ripe follicle has discharged its liquor folliculi, together with the discus proligerus which invests the ovum, the vascular tunic upon which the lutein cells lie suffers considerably. The delicate vessels, already upon the point of rupture, and in frequent instances already ruptured, undergo a further laceration caused by the rise in local blood-pressure which occurs simultaneously with, and seems to explain, the actual bursting of the follicle itself. The increased blood-pressure finds its release by escape of blood from the open vessels in the tunica interna into the interior of the corpus luteum, and some of the lutein cells are swept away into the interior of the blood-stream and can be seen lying in blood-clot. What now immediately follows is a simple illustration of healing by means of blood-clot, such as we meet with after osteotomy for sclerosis of bone. The blood-clot shrinks and divides up into sections, whilst in and around the channels so formed there is a rapid fibroblastic invasion (see Fig. 1). The lutein layer which immediately surrounds the contained clot succumbs before the

invading hordes of leucocytes and fibroblasts, the lutein cells gradually disappear, their place being taken by young granulation tissue. Simultaneously with the formation of this peripheral granulation tissue, the invested clot becomes decolourised and is seen studded all over with branching fibroblasts (see Figs. 2, 3, and 4). A striking difference is now apparent in the fate of the fibrous tissue formed by the organisation of the blood-clot and of that seen at the periphery, whose work it was completely to destroy the lutein cell layer. The latter is true, genuine, highly vascularised tissue, and is essentially reproductive, for by its means the true ovarian stroma is being constantly generated afresh. The former is unworthy of the term "fibrous tissue," and I only call it so for want of a better name; it is not vascularised, it takes no share in regeneration, and is gradually eaten up by such cells as are seen in the peripheral fibrous tissue layer. But this passive termination is not submitted to without some show of resistance; indeed, this inert tissue appears to possess at first a negative chemiotaxis capable of keeping in abeyance at certain points the inroads made upon it by the aggressive circumferential granulations. Tongues of the latter soon however, find their way across it to join up with others, and in this way the hitherto intact corpus albicans is divided up into separate segments. These in their turn allow themselves to be pushed far and wide in the ovarian stroma by the new tissue which is gradually being regenerated within the gland. The islands of passive tissue which are all that now remain to represent a corpus albicans assume striking features. They are to be seen as tortuous snake-like bodies, studded throughout the tissue of the ovary, abundant in the cortex and parenchyma, scanty or non-existent among the vessels of the hilum. They possess a wonderful affinity for eosin dye, which property renders them more easily distinguishable than any other structure of their own size throughout the stroma. They are very hyaline in appearance, and sometimes almost refractile. In Fig. 5 I have represented one of these residual fragments undergoing destruction by fibroblasts derived from the neighbouring young cellular stroma. Of all degenerate tissues with which I am familiar this "*reste*" is the most resistant. In its final stage, without any blood-vessels of its own, and whilst having to subsist like a parasite upon such nutrition as it can pick up from the tissues around, it will exist for years, and its presence is not infrequently capable of demonstration in ovaries which have long lost their normal functions.

As far as I have learned at present, this short description includes all the main facts which are concerned in the healthy natural retro-

gression of a corpus luteum. If the changes proceed in the manner and order in which they are described above, there is no need to say anything upon the subject of the formation of lutein cysts. But the fact is, there are breaks and irregularities in this straightforward process, and these constitute the opportunity for the development—one mode of development—of the cysts in question. A possible error in devolution occurs in the initial stage of the retrogression of a corpus luteum. It happens sometimes that the lutein cells are not completely destroyed by the peripheral layer of granulations (see Fig. 3). Just as in rickets the calcification which precedes ossification proceeds irregularly and allows of islands of cartilage being left unossified, so in the granulations of the lutein layer which precede fibrosis, the process may be irregular, allowing the escape of islands of lutein cells from destruction by phagocytes. The islands of cartilage left after rickets may form a chondroma; the islands of lutein cells may form lutein cysts (see Fig. 6). As there is practically no intercellular substance in an island of compact lutein tissue, the cystic change must occur by cystic degeneration of the cells themselves; and such a process I have been enabled to verify *ab initio*. A lutein cell will lose its nucleus, its protoplasm except at the periphery, will refuse to stain, and it becomes a hollow vesicle. Several will fuse together, by the destruction of their apposed walls, and so a cyst is formed; the inner lining will be lutein cells, uncovered by fibrin and of course devoid of epithelium. It would be difficult, if not impossible, to prove this origin for any non-epithelial lutein cyst which has attained any considerable size; but it is only fair to infer from such microscopical evidence as I have given that such is the origin of some of these cysts. A second way in which cysts develop in the corpus luteum after rupture, is by changes occurring in the central blood-clot, by which it becomes teased out into a coarser and coarser fibrinous network, which breaks down in the centre and a cyst is formed. Another point of interest in the devolution of the corpus luteum concerns the question of the displacement of lutein tissue, but this I intend to refer to under a special heading. For further consideration of the development of lutein cysts, I must now pass on to the more difficult task of investigating the evolution of the corpus luteum, and the origin of the lutein cell.

From the fact that the layers of lutein cells occupy in a corpus luteum the same position which the stratum granulosum occupies in a primordial follicle, I accepted, to start with, the view that the former presented a highly developed type of the latter.

This idea seems supported by the fact that in a ripe corpus luteum, even before rupture, no stratum granulosum can be found as such. In one fortunate section I succeeded in finding an ovum surrounded by its discus proligerus lying free in the fluid contents of the central space, ready, as I suppose, to be extruded; but there was nothing else to be found characteristic of a stratum granulosum. Hence it seemed natural to suppose that this layer had been converted into the lutein layer. Further research has made me alter my opinion. External to the basement-membrane of the stratum granulosum, and lying among the typical oval, rod, and spindle-shaped, young fibrous-tissue cells of the theca interna, and especially in the neighbourhood of free hæmorrhage, we see springing as it were into existence a faintly staining intercellular substance which shows lines of cleavage in the protoplasm. Between these lines a ghost-like oval nucleus makes its appearance, and then the surrounding protoplasm becomes faintly granular and gradually more distinct, and the cell-outlines more definable. If we accept this as histological evidence for the origin of the lutein cell, the explanation of the epithelial lutein cyst becomes a very easy matter, as we shall see later. The question as to when or at what stage we first meet with lutein cells in the normal maturing process of a Graäfian follicle, is difficult. It involves the critical distinction between a small pathological epithelial lutein cystoma and a healthy ripening follicle. If the presence or absence of an ovum in a series of microscopic sections were made the determining factor, the answer would be easy. Unfortunately, the absence of the ovum and its protecting discus proligerus is so common in every series of sections that we are obliged to regard it as due to an accident in section-cutting; for if we could exclude this possibility most ovaries, such as fall into the hands of pathologists, would contain a number of small lutein cysts. There is no reason why they should not; but *prima facie* there is certainly no reason why they should. The argument makes us raise at the same time the question whether we are always correct in our decision as to what constitutes hydrops folliculorum. How are we to say, when adjudging a microscopical cyst, where hydrops begins and where the normal development of the fluid of a maturing follicle ends? The absence of an ovum may be a mechanical accident, even in serial sections, as I have just said. Hence my difficulty with regard to deciding when it is that a healthy follicle puts on its coat of yellow cells. When dealing with a cyst whose size would correspond equally well with that of a follicle midway in its development, or with a small lutein cyst in the absence of an ovum, I know no means of determining which

it may be. But this difficulty does not extend through the whole investigation; for later on a fully ripe follicle is a sufficiently marked structure to be distinguished by the naked eye, and microscopically it is invested by such an abundance of lutein tissue prior to rupture, and with such a comparatively small cyst cavity, that its true nature cannot be doubted. It is in the stage between the commencement of ripening and full maturation that we meet with the development of the majority of lutein cysts. For the want of a better chronological point, we may assume that, at the time certain follicles develop into simple cysts, others acquire, in addition to an excess of liquor folliculi, an early coat of lutein tissue. Now synchronous with the appearance of lutein cells—whether they are to form the investment of a maturing follicle or whether they are to encase a hollow, useless cyst-cavity—some very marked and constant changes occur in the theca interna of the follicle. So constant are these phenomena that I believe the evolution of the lutein cells is entirely dependent upon them; without them the lutein cell could never come into existence. I refer to the enormous increase in vascularity assumed at this time by the theca interna. Not only does this tissue become highly vascularised, but hæmorrhages occur very freely into it; and amongst these free hæmorrhages is seen what I take to be the evolution of the lutein cells. We know how blood-effusions will alter the character of the cells around them, and young newly-formed cells are especially liable to become succulent and swollen. The vascularity of the placenta may account for this feature, as instanced in the decidual cell and the cells of Langhans' layer in the chorionic villi. In the same way I would explain the appearance of the lutein cell: it is a decidua-like cell born in a bath of blood. To pass to the consideration of abnormalities occasioned by this hæmorrhage, I find that it is not uniform in amount around the periphery of a follicle, but may be so excessive at one spot as to invert the stratum granulosum before it, rendering the lumen of the follicle horse-shoe-shaped. At other times the granulosa gives way; and before the ovum is shed, the cavity of the follicle fills with blood, and the ovum if it can be found, then appears as a hollow vesicle surrounded by the cells of the discus proligerus. But in spite of their protection, it will be seen to have lost both nucleus and nucleolus. Another very striking feature is a change in character in the tunica fibrosa which occurs as the follicle approaches maturation. This coat of the follicle secondarily to its increased vascularity, becomes extremely cellular. Young fibrous-tissue cells develop in connection with the delicate capillary loops which everywhere invade this tunic;

and once more, it is amidst these cells, which are their primogenitors, and are surrounded by effused blood, that the lutein cell is evolved. *These lutein cells can be seen to increase in number outside the basement-membrane of the stratum granulosum.* They ultimately form a complete band of large mononuclear cells, densely packed together into segments, and the latter are divided by capillary loops which grow in from the surrounding vessels of the theca interna.

Corpus Luteum Hæmatoma. From the excessive outpouring of blood in the theca interna, a corpus luteum hæmatoma may arise. I regard this phenomenon as always starting prior to rupture of a Graäfian follicle, whilst its blood-supply is at its zenith. After rupture, the cavity fills with blood, it is true; but this is a rapid and temporary effusion, followed very quickly by the organisation of the fibrous tissue layer which replaces the lutein cells. The stimulus of a presiding ovum is gone, and with it subsides the intense vascularity and the risk of hæmorrhage. The local excess of blood is dried up after the final avalanche, and the latter if excessive, would find its vent through the same channel which was provided for the escape of the liquor folliculi, ovum, and discus proligerus. It is during the congestive stage, then, of a maturing corpus luteum that we must expect to find the source of lutein hæmatoma; and this source is amply provided by the phenomena described above, namely, the effusion of blood from the vessels of the tunica interna pushing before it the stratum granulosum, and after rupturing this layer, filling up and distending the cavity of the follicle. This same hæmorrhage may divide the lutein lamina concentrically, so that the latter may appear as two rings at the periphery of a hæmatoma. This was what Rokitansky termed "doubling of the yellow body." When the blood-clot which exists between the now divided layers of lutein cells becomes organised into fibrous tissue, the latter will displace any lutein cells which still remain, so that their association with the hæmatoma, by the time the latter has assumed a considerable size, may be hard if not impossible, to demonstrate. Another structure which disappears even before the lutein cells is the stratum granulosum: this is broken up by the in-rush of blood and is seen, first in small fragments in the blood-clot, and then finally disappears. It is my belief that most true ovarian hæmatomata arise in connection with developing corpora lutea or in the course of formation of lutein cysts. My reason for this conviction is that no other part of the ovary shows such a wealth of young newly-formed, but congested, capillaries, as the fibro-cellular theca immediately investing these hollow bodies. The internal blood-pressure of the ovary, especially

when unduly raised by the stimulus of menstruation, or by the more persistent effects of inflammatory conditions, can more easily cause rupture of these newly-formed vessels than of those which are older and better developed. It seems clear, by the way, that this constant formation of vascular fibrous tissue around developing follicles is continually regenerating and laying down new ovarian stroma. In the development of this fibrous tissue we see a continuous centrifugal new formation of stroma taking place. In the case of a hæmatoma or of a lutein cyst, this process aids in the displacement of lutein tissue, just as during the involution of a normal corpus luteum it caused the dispersal of the fragments of the corpus albicans.

With regard to the clinical association of ovarian hæmatomata, I have never found a hæmatoma of any considerable size apart from tubal disease of some kind or other. In one specimen now in my possession the tube is infected with tubercle, in another it is the seat of a molar pregnancy. In both these instances the ovaries were invested by dense adhesions, but in another specimen—the largest of the three—the somewhat thickened tube is quite free from adhesions and is associated with a fibroid uterus of some size. In this third case there was a closed fissure of the tunica albuginea about an inch long at its thinnest part, showing that rupture had taken place and that the linear rent had closed again. The blood in this instance was the colour of anchovy paste and contained a large amount of cholesterin crystals. In a fourth instance, where I removed the tubes and ovaries for chronic salpingo-oöphoritis during an operation for fixed *retroflexio uteri*, I found within one of the ovaries (which was densely matted to the corresponding tube and parts around) a corpus luteum cyst, the size of a small walnut. This cyst was filled with a glistening, yellow, semi-fluid substance, which on microscopical examination proved to be altered blood containing cholesterin. The cyst therefore represented a type of degenerating lutein hæmatoma. It contained no pus, but its contents afforded a proof that these collections of blood undergo retrograde changes which predispose to pus-formation, so that a lutein hæmatoma may legitimately be regarded as a precursor to a lutein abscess. A good many corpus luteum cysts arise precisely in the same way as a hæmatoma originates from a developing yellow body, so that when small, they appear full of fibrinous clot; but for some unknown reason the hæmorrhage is checked, and a central cystic space forms, whilst the peripheral clot becomes organised and forms a fibrous tunic internal to the lutein layer. This organisation varies greatly in degree, so that in the case of some of the largest cysts we find an

internal lining consisting of nothing but the most delicate fibrin, in which no true fibrous tissue is evident (Fig. 8, Malcolm's case), whilst in comparatively small microscopic cysts there will be found a fairly thick layer of young fibrous tissue (Fig. 9, Oldfield's case).

Other lutein cysts are invested with a layer of cubical or spherical epithelium (Figs. 10, 11, 12, and 13). These cysts arise from the maturing follicle before it loses its epithelial coat. There is much variation in the character of the epithelium, and this is due to the great tendency to metaplasia in this type of cell, a feature which may, or may not be indicative of a pathological condition. In Fig. 8 is shown the transition in shape which these cells are undergoing in a much distended follicle: it is certainly here associated with, if not part of, a pathological change. Again, we see ova surrounded by columnar epithelium instead of the usual spherical cells within primordial follicles, whilst in large pathological cysts lutein cells may be seen covered with typical granulosa cells (Fig. 13, Williamson's case). Why in one instance this metaplasia occurs and in another it does not, I cannot say; but it is more usual to find that the granulosa layer which covers the lutein cells in an epithelial lutein cyst is composed of well-developed columnar epithelium. In my opinion the assumption of a coat of columnar epithelium is a sign of retrogression in a Graäfian follicle.

To sum up, as far as I have gone, the various modes of origin of lutein cysts, we find that they may be tabulated thus:—

Retrograde stages of corpus luteum, give
1. Cysts arising in the central clot.
2. ,, ,, from displaced lutein tissue.

Maturation stages of Graäfian follicle, give
1. Epithelial-lined cysts due to persistence of the granulosa.
2. Non-epithelial cysts due to absence of granulosa.
3. Hæmatomata.
4. (To be referred to later). Lymphangiectases.
5. (To be referred to later). Complication cysts.

Fortunately the majority of these cysts have no clinical significance whatever, but under certain conditions not yet determined, they develop very rapidly by a process of multiple cyst-formation rather than by any enormous distension of a single cyst, the result being a tumour generally not less in size than a fœtal head, composed of a central core of œdematous ovarian stroma and a peripheral zone of cysts. Among these last strands of the central stroma proceed forming the septa, which are often extremely thin,

the cysts being set so closely together. I have reason to believe that these cysts may be multiple from their beginning, as I have found a small bi-locular cyst in process of development from a maturing follicle (Fig. 10). None of the loculi are septate in these large cysts, the structure of walls varying according to size of the loculus. Even in the thinnest there may be a thin lining of fibrous tissue between the lutein cells and the cavity of the cyst, but the lutein cells may themselves form the innermost lining. A fibrinous coating is not uncommon even in cysts of considerable size, and perfect columnar and spherical epithelium may remain in some of the loculi of quite extensive multilocular cysts. The largest cysts generally contain a clear, highly albuminous, pale, straw-coloured fluid, which coagulates spontaneously and which hardens to a firm jelly in Kaiserling-Pick's solution (Fig. 14). Externally these cysts present in the aggregate a very irregular appearance, and have not inaptly been described as resembling "bubbles about to burst." No other type of ovarian cystoma resembles them in the least. In the four pairs which I have studied, there was no sign of their becoming adherent; the tubes were quite free and unaltered in relation to the cystic ovaries. The right-sided cyst in Mr. Malcolm's case was strangulated, and the clear contents were consequently mixed with blood. These cysts are large enough to be of clinical importance. Their presence is an obstruction to delivery, and even to the escape of a molar pregnancy, and they can, as just mentioned, give rise to severe and acute symptoms from twisting of their pedicles. The full description of the naked eye appearances of the eight cysts which I have examined are added in an appendix to this paper. For the above material I am indebted to Mrs. Scharlieb, Drs. Williamson and Andrewes, of St. Bartholomew's Hospital; Dr. Carlton Oldfield, of Leeds, and my colleague, Mr. Malcolm.

A pair of ovaries was kindly lent me by Mrs. Scharlieb (see appendix); Figs. 1, 14, and 15 were taken from sections prepared from these cysts. Fig. 1 represents the structure of a recently-ruptured corpus luteum, and was taken from the cortex of the smaller left ovary. Figs. 14 and 15 show sections taken from the walls of two of the cysts seen in the periphery of the same ovary. These sections were prepared after the cysts had been hardened entire in formalin solution, and they show the solidified albuminous contents with a series of linear cracks due to preparation in the paraffin bath. Fig. 14 represents a septum common to two large cysts; the lutein layers on each side are well represented. The cells have been flattened out by pressure, so that they now appear as

a compact nucleated lamina, not unlike syncytium in general features. The lutein lamina forms the innermost lining to the cysts, no fibrin, fibrous tissue, nor epithelium existing between it and the albuminous contents. Fig. 15 shows a similar cyst-wall, but in this instance the lutein-layer has in part undergone displacement, so that in the lower end of the drawing there are no cells present; here they are relegated to the periphery of the cyst-wall, only a thin strand of fibrous tissue intervening between them and the peritoneal surface. Sections through three of the largest cysts in the right ovary show the lutein tissue reduced to a minimum and in places entirely absent. In one of these, however, a short strand of cubical epithelium is left, showing that this cyst at least did not arise from a ripe corpus luteum. The true ovarian stroma is very œdematous and contains displaced lutein cells.

Dr. Williamson's specimens which can be seen in the Museum of St. Bartholomew's Hospital, are interesting from the fact that the tissues stain well, and the nuclei of the cells show distinctly, in spite of the fact that the specimens have lain in spirit since 1872. Figs. 12, 13, 15a, 16, and 17 were prepared from these cysts. The epithelial type of cyst and the non-epithelial are well represented. Of the epithelial there are two varieties, one lined by several layers of round cells, in shape and size resembling the cells of the stratum granulosum; the other with well-formed columnar epithelium as an internal layer (see Figs. 12 and 13). The fibrinous cysts show thick wavy folds and tufts of partly organised fibrin on a base of fairly dense fibrous tissue, whilst the lutein cells are removed to a distance and lie in ovarian stroma in the neighbourhood of primordial follicles. The most noticeable feature of these ovaries is the uniform distribution of the lutein cells throughout the very œdematous stroma (see Fig. 17); in nearly every field of the microscope they are seen lying in the clefts caused by the separation of the strands of fibrous tissue by the œdematous fluid. Syncytium-like masses of lutein tissue exist also in abundance amongst the yellow granular *débris* which fills the lumina of many of the cysts (see appendix); this is depicted in Fig. 15a. The ovarian stroma contains a great number of primordial follicles; this is explained by the fact that the patient's age was only 23 years.

From Dr. Oldfield's case of double ovarian cystoma were prepared Figs. 9, 18, and 20. No lining of epithelium was found in any of the sections examined, and in the majority of the cysts the lutein tissue was uncovered internally. Some of the thicker walls show the lutein layer split up by fibrin and fibrous tissue alternately, so that

as many as three layers become apparent (see Fig. 18). In Fig. 9 there is a strong well-formed fibrous layer on either side of the lutein lamina. In Fig. 20, on the other hand, the lutein tissue is bare.

In Mr. Malcolm's case the ovarian stroma shows very little displaced lutein tissue. It was œdematous and vascular, but was so encroached upon by the cysts as to be small in amount. Fig. 21 shows the characters of the wall of one of the larger cysts. It consists of an internal layer of fibrin, a second layer of dense lamellar lutein tissue, a third of blood-clot, and a fourth of theca interna shading off into less vascular ovarian stroma. At B is seen an island of displaced lutein tissue. The right-sided tumour, where the pedicle was twisted, shows the result of stasis in all the vessels, and it is noteworthy that the theca interna around the cyst walls has here suffered the most; the fibrous tissue and the lutein lamina are both infiltrated with blood, and the latter has escaped into and filled up many of the cyst cavities. In some of the cysts there are remains of an epithelial lining, the cells in some instances being spherical, in others low-lying cubical epithelium with basal nuclei. In the ovarian stroma are seen some follicles in a state of hydrops, with no lutein investment, a condition which I have not observed in any of the preceding specimens.

So much, then, for the study of lutein cysts, with which I have purposely included hæmatomata, for, as already pointed out, the origins of hæmatomata and of those cysts which arise during the evolution of a corpus luteum, are in so many respects similar. Three pathological conditions remain to be described: (1) the displacement and "excess" of lutein tissue; (2) the lutein abscess; (3) calcification of the corpus luteum, and lutein hæmatoma.

1. It is not always easy to determine an "excess" of lutein tissue, as it is difficult to adopt any standard of measurement for the amount of this substance existing in a normal ovary. This difficulty becomes more and more impressed upon the observer after he has learnt to recognise lutein tissue in the various stages of its evolution and devolution. A casual glance will reveal to the superficial observer the relative amount of healthy ripe lutein cells around cystic spaces, but more careful investigation brings to light the same cellular tissue in process of formation and degeneration around dropsical follicles, and in process of devolution within the meshes of newly-formed ovarian stroma. If we take note of the aggregate of normal lutein cells in process of formation, maturity, and retrogression, we find that in many ovaries—at any rate, many of such as

come to the pathologist,—there is a great amount of this tissue present in cases where it seems to have no pathological significance. Nor is this tissue solely characteristic of the body usually understood by the term "corpus luteum"; it is seen around follicles which have never ruptured and which contain no ova; around follicles, that is, in a state of hydrops, and which will therefore never undergo physiological rupture, there being no ovum present to be extruded. Such cysts as these are present in the majority of the ovaries which I have examined, and I cannot bring myself to believe that amongst something like fifty ovaries I should have found excessive lutein tissue in the majority. When, however, the stroma of the ovary contains large lutein islands or lutein cells profusely distributed in a discrete manner throughout its substance, then we are face to face with an unusual and abnormal phenomenon, and we need have no hesitation in regarding this condition as true excess. I have met with one notable example of this undoubted excess, in the ovaries of the case of chorio-epithelioma which I showed at The Obstetrical Society at the June meeting on the subject of chorio-epithelioma (see *Trans. Obstet. Soc.*, London, Vol. xlv., pp. 245–313, 1903, and for a complete description of the case see *Practitioner*, December, 1904). Both ovaries appeared normal and were described as such by Dr. Hobhouse, of Brighton, who made the autopsy, but on examination I found they contained, in addition to a large number of epithelial-lined lutein cysts, a vast amount of discrete and compact lutein cells throughout the stroma. Figs. 3, 6, 6a, 10, 11 and 26 are drawings taken from sections made of these ovaries. In Fig. 6 is seen a wide belt of lutein tissue situated at the periphery of the ovary, almost flush with the peritoneum. In 6a the ovarian stroma is almost universally studded with lutein cells, and in one island a large well-formed cyst is seen. Again, in Dr. Williamson's case of chorio-epithelioma, where there were polycystic tumours of both ovaries, the solid ovarian stroma was studded throughout with lutein cells (see Fig. 17), as was also the *débris* forming the contents of the cysts (see Fig. 15). Even if in this case there had been no lutein cysts, there was sufficient lutein tissue disseminated in the stroma of the ovary to constitute an excess. Never have I met with anything like this amount of lutein tissue, except in glands such as the above which were associated with vesicular mole or chorio-epithelioma. Inasmuch as all the loculi of the polycystic tumours above described were lined by lutein tissue, the amount of the latter must of course, have far exceeded the normal, even had there been none in the solid stroma, but as a matter of fact, the œdematous stroma forming the core of these tumours was,

without exception, the seat of small lutein cysts surrounded by enormous bands of solid lutein tissue. In Kelly and Teacher's case of chorio-epithelioma—Dr. Teacher kindly sent me segments of both ovaries to examine—the smaller ovary contained many minute lutein cysts, the larger one not so many; but taking the two together, the amount of lutein tissue is striking. There is, however, no general dissemination, such as I found in the case of chorio-epithelioma with "normal" ovaries, published in the *Practitioner*. The question arises, how do these cells become so universally distributed? Have they any malignant propensity, giving them the inherent faculty of invasion? I can find no evidence to show that they have. They are not disseminated by the blood-stream or by the lymphatics; they never find their way even into ruptured lymph-channels or blood-vessels; they show none of the features of invading malignant cells. In my opinion, their distribution is due to a passive displacement. They are only formed in the deeper layers of the theca interna folliculorum, whence they get dislodged as I have already pointed out, firstly by cleavage of the lutein layer by effusion of blood, and secondly by the invasion of the lutein layer by fibroblasts and the subsequent laying-down of fibrous tissue. The centrifugal regeneration of ovarian stroma which has its origin around each retrograde corpus luteum scatters these cells radially towards the periphery of the gland, where they often aggregate in large numbers, or where they may be seen as a narrow band lying just beneath the tunica albuginea. Once again I would repeat that I have never found this process demonstrated except in apparently normal ovaries associated with vesicular mole and chorio-epithelioma.

II. Corpus Luteum Abscess.

During the past eighteen months I have met with two cases of large corpus luteum abscesses—one in my own hospital practice and one from the private practice of a London gynæcologist. In my own case the tumour was the size of a fœtal skull, and was densely embedded in the left side of the pelvis, displacing the uterus to the right. The right ovary in this case contained a calcified corpus luteum. This specimen being almost unique, I am recording the case in the appendix. Upon searching the literature, I find that Orthmann describes a case of double "sacto-salpinx purulenta" (pyosalpinx), in which there was a right-sided corpus luteum abscess, and also two concretions in the left ovary, in size between that of a pea and that of a hazel-nut. These concretions contained a folded hyaline layer like a lutein lamina, and after decalcification the latter

tissue was proved to be present. The description of my own case of calcified corpus luteum will be given below. The main feature of the abscesses derived from the corpus luteum is that their inner wall is tuberculated, appearing as if studded with small papillomata, whilst the entire surface presents, when first opened, a yellow ochre colour. There is nothing distinctive in the appearance of the pus. This in my own case contained flocculent particles of necrotic tissue. It was not examined for micro-organisms, the clinical history did not bespeak the presence of pus, as there had not been a rise of temperature whilst the patient was under observation, and again from the fact that the investing adhesions were densely thick and of cartilaginous hardness, it is to be inferred that the abscess was of very chronic formation. It has been suggested by German observers that corpora lutea become infected after rupture by gonococci, which enter at the point of rupture and find in the blood-clot a suitable nidus for development. I have no proof to offer in support of this statement, but in the two cases I have examined there was purulent salpingitis; whether this was of gonorrhœal origin or not I cannot say. (For a description of the abscess-wall in each of the above cases see Figs. 22, 23, and 24.)

III. Corpus Luteum Calcification.

I have only once met with an example of this condition. The case has been referred to under "abscess of the corpus luteum." The right ovary was reduced to a thin fibrous capsule, from which a corrugated calcareous body was easily shelled out. It was oval in shape, and the size of a large walnut. Its external surface presented irregular rugæ, yellow in colour. On naked-eye section it was found to consist of a thin shell of calcified tissue, within which lay a shrunken dark-red blood-clot. Although very thin, the calcified lamina of lutein tissue was very hard, and it took some six weeks to de-calcify in dilute hydrochloric acid. The microscopical features are shown in Fig. 25; this represents a drawing of the calcareous wall of the cyst. Internally is seen a loose membrane containing lutein cells; then comes a broad band of decalcified tissue, which opens out to include a space filled with a loose reticulum and lutein cells. Several such spaces exist in the calcareous tissue, and in many of them lutein cells still persist, thus showing that the yellow layer is the seat of the deposit. But the calcified bars are not confined to the lutein zone; they spread wide of it into the theca interna. Now this is the situation where new vessels are found, and free hæmorrhage takes place during the final

stages of maturation and also at the time of rupture of a ripe corpus luteum; the calcareous deposit is therefore laid down precisely where extravasation of blood is so frequently detected. This leads to the conclusion that there has been calcification of the peripheral blood-clot around a ripe ruptured or unruptured follicle, or around a corpus luteum hæmatoma. In Orthmann's case of double sacto-salpinx purulenta already referred to, there were two concretions in the left ovary of much smaller size than the calcified lutein body which I am describing. This author mentions that Rokitansky, Bland-Sutton, and Hector Mackenzie have each recorded a case of calcareous corpus luteum. Slavianski mentions a case of a woman aged 71 years, in whom the right ovary, covered with a pseudo-membrane, contained a concretion of the size of a hazel-nut; this easily shelled out, and after decalcification gave the impression of being a degenerated corpus luteum. Orthmann found that his calcareous bodies contained a folded hyaline layer "like the lutein layer."

This completes the only records of these bodies which I have found. Although Orthmann gives Bland-Sutton the credit of recording a case of his own, I cannot find any record of this in Bland-Sutton's book on surgical diseases of the ovary; but under the heading "Ovarian Concretions" in this work the author says, "the only instance of concretions occurring in the ovary is recorded by Dr. H. W. G. Mackenzie (*Trans. Path. Soc.*, London, Vol. xl., p. 198). The patient was forty-one years of age, and suffered for two years from menorrhagia; she had a large myoma of the uterus. The ovaries were enlarged and contained a number of black, hard, flat bodies. The cavities containing them were smooth-walled. The concretions were of various sizes from a coriander seed to a small bean, and of irregular shape, but their surfaces were smooth and flattened where they had come in contact with one another. They were firm and hard, but light, and could be cut with a knife very like hard wax. Under the microscope, sections prepared from the concretions exhibited no structure, but there were *indications* that the mass consisted of spheroidal bodies. Dr. Copeman attempted to determine their chemical constitution. They were insoluble in acid and alkaline solutions, and in ether and chloroform. Prolonged digestion with artificial gastric juice in an incubator at the body temperature dissolved them. The coloured solution thus obtained gave the spectrum of acid hæmatin and the guaiacum reaction for blood. The concretions probably consisted of coagulated proteids derived from blood-clot, akin to lardacein, and of the same family as the concretions of the prostate and the amyloid bodies

sometimes found in old hæmorrhages. It is probable that the cavities which contained the concretions were ovarian follicles, and that blood had been effused into them and undergone a rare colloid change. It is not unusual to find hard clots of blood in ovarian follicles, but concretions of the density exhibited in this specimen are excessively rare." It is clear from this description that the bodies described in no way resemble the definitely calcareous lutein body of which a drawing will be found in Plate I. My specimen is a hollow shell formed by calcareous incrustation of the lutein layer and the theca interna, and containing a shrunken blood-clot of the size of a walnut. Such a structure has hitherto never been described; I have therefore given a short summary of the clinical history of the case in the appendix to this paper. With this account ends my personal investigations on the development and retrogression of the corpus luteum.

(To be Continued.)

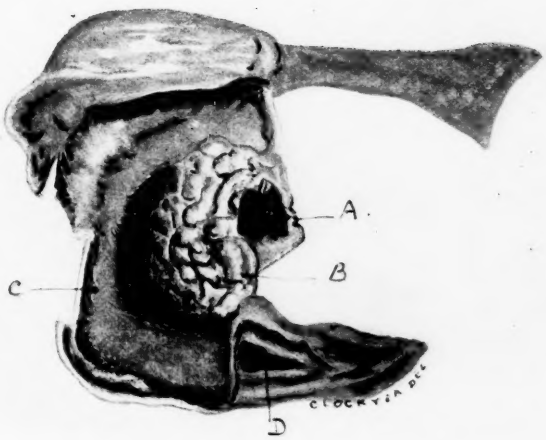

PLATE I.—Calcified Corpus Luteum Hæmatoma. (*a*) Blood-clot, within. (*b*) Thin shell of calcareous yellow tissue. (*c*) Capsule of ovarian tissue. (*d*) Small lutein hæmatoma.

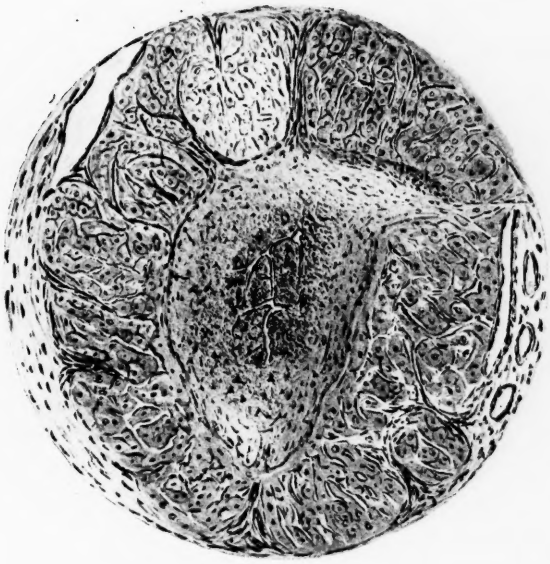

FIG. I. Illustrating corpus luteum filled with blood-clot.

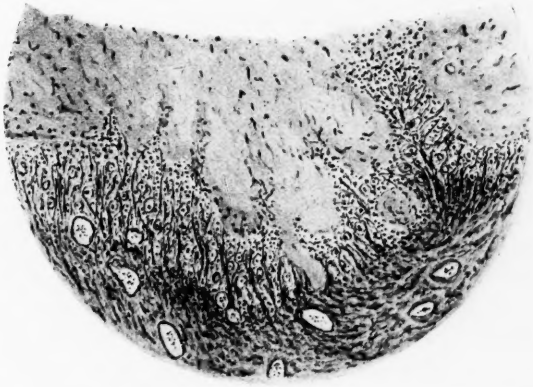

FIG. II. Illustrating fibroblastic invasion of the lutein cell layer after rupture of a corpus luteum, some of the lutein cells still remain undestroyed. The fibroblasts are preceded by a round-celled infiltration which can be seen advancing in cristate form into the already semi-organised fibrinous decolorised clot.

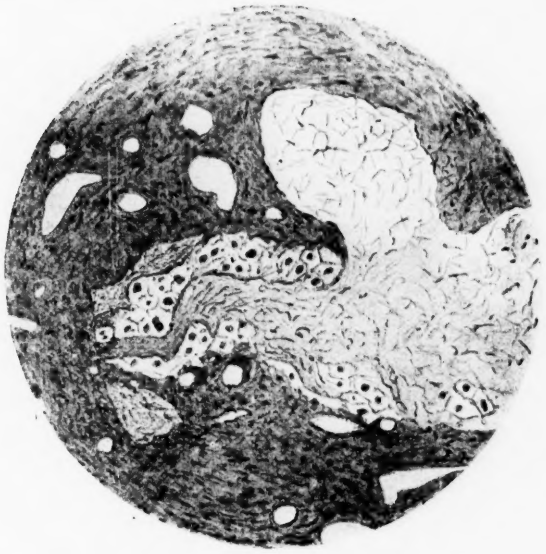

FIG. III. Shows an advanced stage of Fig. ii. There are a few lutein cells left around one process of the corpus albicans which have not yet been replaced by granulation tissue. This must have been purely accidental, as all around is seen fully formed fibrous tissue indistinguishable from ordinary ovarian stroma.

FIG. IV. Illustrating the total displacement of lutein cells by young granulation tissue, which is throwing out centripetal processes into the interior of the corpus albicans preparatory to severing it into tortuous fragments. See Fig. V.

FIG. V. Shows the final stage in the retrogression of a corpus luteum. The corpus albicans now consists of hyaline highly staining, tortuous strands of degenerate tissue, quite devoid of cells. Its destruction by phagocytes is proceeding. It forms no part in the permanent ovarian stroma but may last for years, even after the menopause.

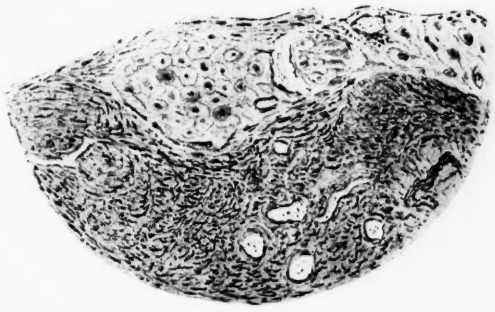

FIG. VI. Showing a displaced island of lutein cells containing a cystic space. The lutein tissue lies under the tunica albuginea which is thinned out over it.

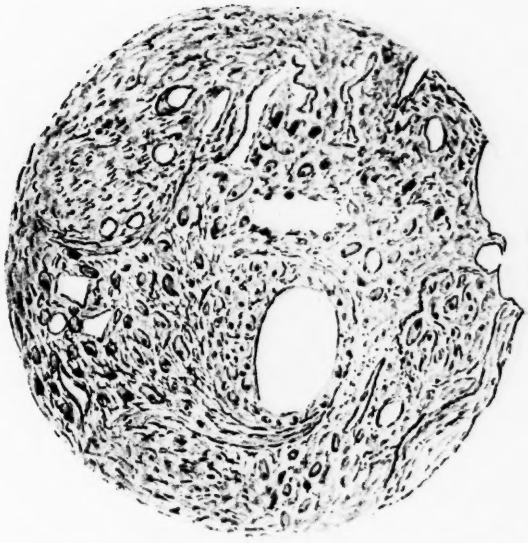

FIG. VI. (*a*). Free lutein cells showing cystic formation.

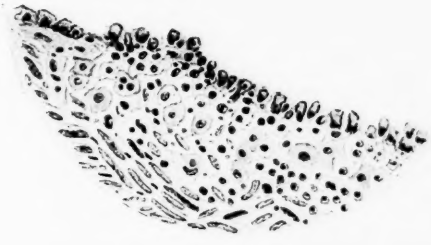

FIG. VII. Suggesting the origin of the lutein cell from inter-cellular substance thrown out by fibroblasts of the theca interna external to the stratum granulosum. The lutein cell, as the decidua cell which it resembles, would be therefore of connective tissue origin.

FIG. VIII. Wall of a distended Graäfian follicle, showing the transition from spherical epithelium to columnar, and the early formation of lutein cells.

FIG. IX. Showing fibrous lining internal to lutein layer

FIG. XI. Showing lutein cyst lined by the columnar epithelium of the stratum granulosum.

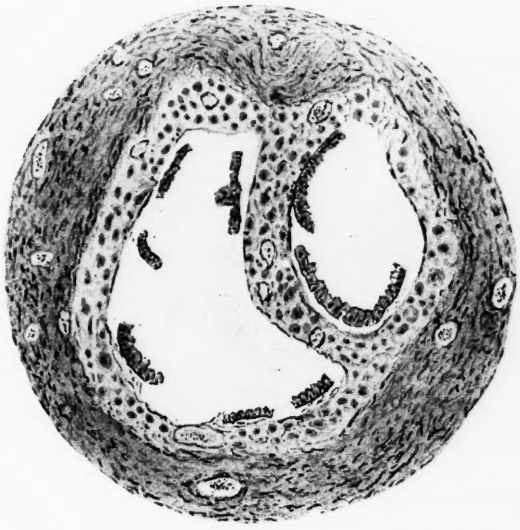

FIG. X. Showing a lutein cyst, bilocular in origin.

FIG. XII. Lutein Cyst. Showing a lining of columnar epithelium.

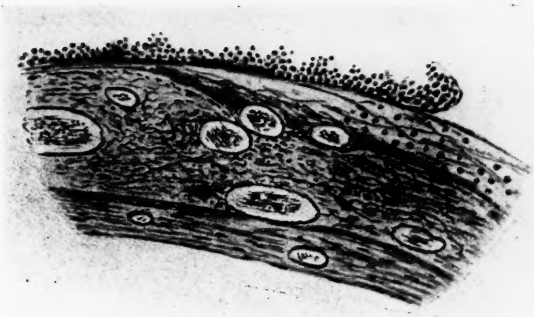

FIG. XIII. Lutein Cyst lined by spherical cells of stratum granulosum.

FIG. XIV. Showing septa common to two cysts, each containing albuminous fluid hardened by formalin.

FIG. XV. Showing the albuminous fluid hardened by formalin. Displacement of lutein cells has taken place.

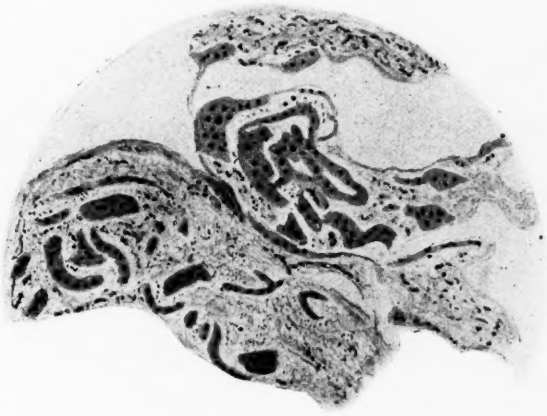

FIG. XV. (*a*). Syncytium-like masses of lutein cells lying in the yellow débris which completely filled a lutein cyst.

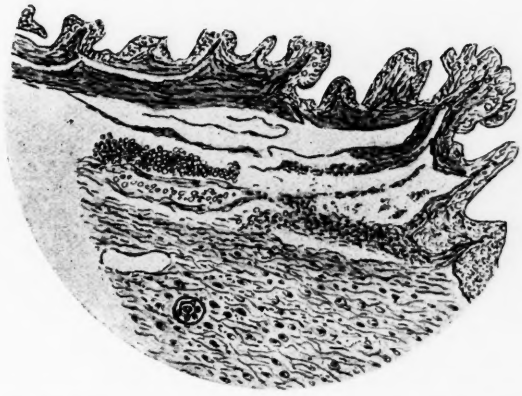

FIG. XVI. Fibrinous wavy lining to cyst wall. Lutein cells distributed in stroma beneath.

FIG. XVII. Lutein cells distributed in ovarian stroma

FIG. XVIII. Showing "doubling" of lutein layers by intervention of blood-clot and fibrous tissue.

FIG. XX. Lutein Cyst. Taken from the thinnest part of a large loculus.

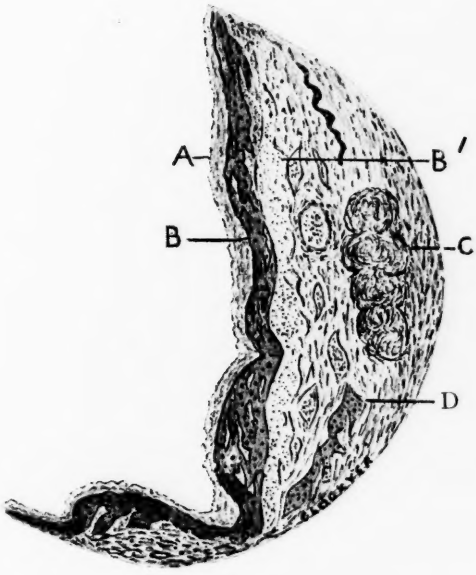

FIG. XXI. Showing (*a*) Internal lining of fibrin. (*b*) Lamellar arrangement of compressed lutein cells. (b^1) Layer of blood-clot within theca interna. (*c*) Corpus albicans. (*d*) Displaced lutein tissue lying in ovarian stroma.

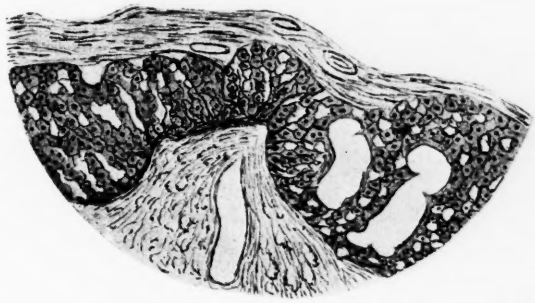

FIG. XXII. Corpus Luteum Abscess. Showing a lining of fibrous tissue internal to lutein cells.

FIG. XXIII. Lutein Abscess. Showing one of the tufts which give the papilliferous or "frog-spawn" appearance to the yellow abscess wall.

FIG. XXIV. Corpus Luteum Abscess. Showing (1) A lining of degenerate lutein tissue devoid of nuclei. (2) Hyaline degeneration of the fibrous tissue contained in the abscess wall.

FIG. XXV. Calcareous Corpus Luteum or calcified lutein hæmatoma. Showing (1) Lining of degenerate lutein cells. (2) Calcification of lutein layer and of theca interna.

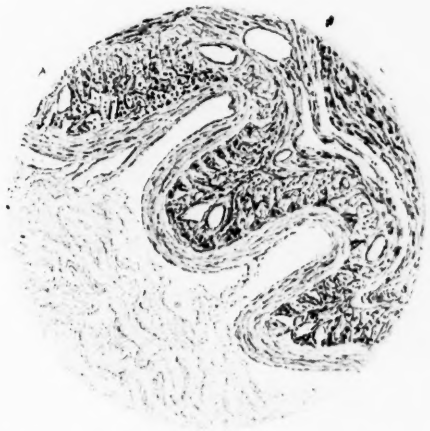

FIG. XXVI. Section shows the convoluted arrangement of the lutein cyst wall.

FIG. XXVII. Showing early cystic formation by breaking up of fibrin in centre of a ripe follicle.

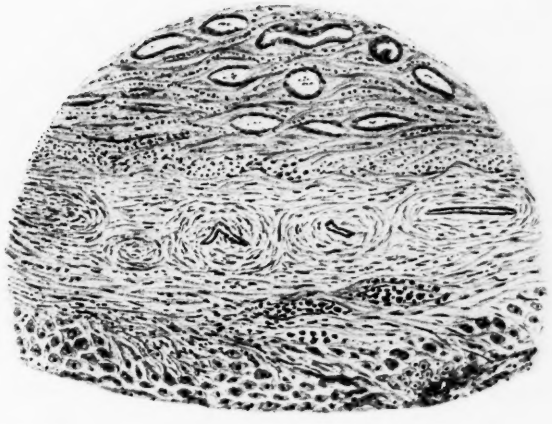

FIG. XXVIII. Lutein Cyst Wall from a case of chronic salpingo-oöphoritis.

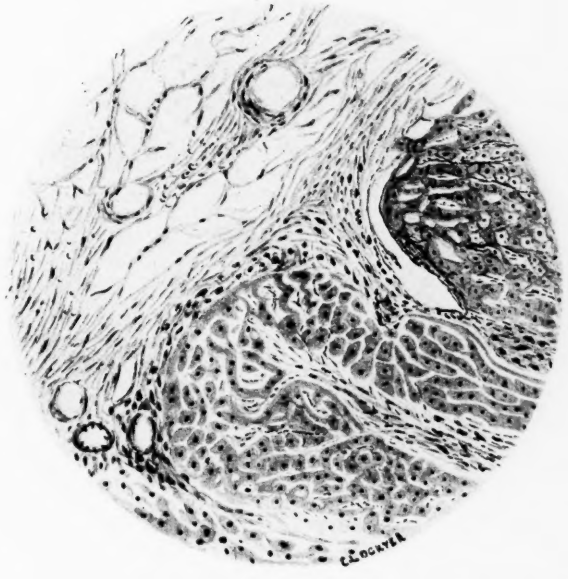

FIG. XXIX. Normal corpus luteum showing festoons of lutein cells.

In Defence of the Pessary.*

By Geo. Granville Bantock, M.D., F.R.C.S. (Edin.),

Consulting Surgeon to the Samaritan Free Hospital.

In the course of this year two papers have appeared on the subject of the use of the pessary, the one entitled "On the Application of Pessaries and their Dangers,"† the other "Pessaries: Their Uses and Limitations."‡ Both of these contain statements which challenge criticism.

With regard to the *dangers* of the pessary it would be quite as much to the point to speak of the dangers of the scalpel. The dangers arising from the use of the pessary are due to ignorance, want of skill, or carelessness on the part of the practitioner, or to ignorance and carelessness on the part of the patient. The practitioner is either ignorant of the principles of its proper use, or deficient in skill in employing it, or careless as to the instructions he gives the patient; or the latter being wholly ignorant of the subject, is careless in carrying out her instructions.

The authors of these papers seem to have brought together the *possibilities* of danger as a peg on which to hang a plea for surgical interference, but they are unable to produce any evidence in support of their argument. They are much taken up with "the pathological conditions (in the words of one of them) which contraindicate the use of any pessary, and where its presence constitutes a distinct danger." The use of a pessary under these circumstances must surely be regarded as an indication of gross incompetence.

With regard to their "uses and limitations" I am in accord with much of the argument of the writer, but when he speaks of them as a *necessary evil* I entirely disagree with him. If this be correct, then, any operation or method of instrumental treatment is a necessary evil—even the wearing of a set of false teeth. Now there are only four conditions affecting the uterus to which the use of a pessary is applicable. These are uncomplicated retroversion, anteflexion, retroflexion and prolapse. Perhaps I ought to include elongation of the cervix; but as it is usually associated with some

* Read at a meeting of the Edinburgh Obstetrical Society, December, 1904.

† Macnaughton-Jones, *Brit. Gynæcol. Journ.* and *Med. Press and Circular.*

‡ Giles, *Med. Press and Circular.*

prolapse of the whole organ it scarcely deserves to be erected into a separate class. The enumeration of the various pathological conditions that may be associated with these serves only to obscure the subject, for they, not the displacement, become the subject of our solicitude. But the examples of the *abuse of* the pessary enumerated by this author are quite to the point. When, however, he says that "properly fitting pessaries, rightly applied, have enough to answer for in the way of drawbacks and complications," I find another point for disagreement.

In Schultze's work on "Displacements of the Uterus" 66 pages are devoted to the pathology and terminology, yet these subjects can, for practical purposes, be disposed of in a few lines, or at most, pages. It may seem trifling with the subject to ask the question, "What is a displacement?" But it is not so, as a proper answer to this question is absolutely necessary. A displacement, properly so called, is a departure of the uterus from its normal *position.* Hence there is in reality only one form of displacement, viz., retroversion. I am glad to find that there is a general acknowledgement that anteversion of the uterus is not a pathological condition *per se.* This is the position I took up nearly a quarter of a century ago, but it has not yet met with acceptance by the author of the first paper. The normal position of the uterus with regard to the axis of the vagina is one of anteversion, and to speak of anteversion as a displacement is obviously incorrect. Amongst writers on this subject generally—and this is characteristic of the two above referred to—no distinction is drawn between *retroversion* and *retroflexion.* Schultze, in one of his tables, groups these under the head of retroflexions, and in another brackets them. Now a retroversion means a *turning* backwards, and a retroflexion a *bending* backwards, of the organ. This is a distinction with a mighty difference, and ought to be kept clearly in view. No work with which I am acquainted, with the exception of that of Hart and Barbour, clearly observes this distinction. Others use the terms as being synonymous. Hence we find the greatest discrepancy as to their relative frequency. This is seen in a table of Schultze's in which he gives, under the head of retroflexion the experience of various authors, the frequency ranging from 12 to 198 "per 1,000 cases of diseases of women," from 200 to 297 "per 1,000 displacements," and from 84 to 550 "per 1,000 flexions."

Strange to say, the distinction between *anteversion* and *anteflexion* seems to be observed. Of the first Kolb says, "As a matter of course anteversion *cannot* attain a very high degree," To this I may add that any exaggeration of this, which I call the normal condition will be due to a pathological state which then becomes *the* point for

consideration. I do not know why so many gynæcologists of the day should persist in saying that anteflexion is the normal form of the virgin uterus. It is not so described in Quain's anatomy, but is represented as being quite straight. No notice appears to have been taken of the special investigation of Bandl, who as the result of *post-mortem* examination of a large number of cases arrived at the following conclusions:—"In the new-born the uterus was partly straight, partly in slight anteflexion, lying in the pelvic axis." "In older children, in whom the body of the uterus has acquired greater firmness, that organ is far more frequently found straight." "The straight form of the uterus is frequent as compared with the anteflexed."

A great deal has been written about the causes of uterine displacement. I particularly refer to retroversion. I do not see how any knowledge of this kind can help us in the least in the matter of treatment. We are not called upon to prevent displacement, but to remedy it, except in the case of a patient who has been the subject of displacement previous to a pregnancy which had been brought about perhaps, or at least aided, by the application of a pessary—of which I have seen many examples. The surgeon is not aided in his treatment of a broken leg by a knowledge of the way in which the fracture has been sustained. The only opportunity for practising preventive treatment arises when the subject of a retroversion has become pregnant while wearing a pessary, or was known to have a retroversion at an early stage of pregnancy. In such a case the patient should not be allowed to lie on the back during the puerperium and the earliest opportunity should be taken to ascertain the position of the uterus. Such a case has come under my notice while writing this paper. Some few years ago I found the patient to be the subject of a very bad laceration of the perineum, a large rectocele, a smaller cystocele and a well-marked retroversion. I restored the perineum with a view to a subsequent pregnancy, and applied an Albert Smith-Hodge's pessary, which gave immediate relief to very distressing symptoms. In January last, after the lapse of about seven years and believing herself pregnant, she again consulted me, earnestly desiring that I should produce abortion because she was afraid she might have a repetition of her former trouble. I comforted her on this point, instructed her not to lie on her back after delivery, and wrote to her medical attendant. My instructions were rigidly carried out and when she came to me at the end of three weeks I found the uterus in perfect condition. My intention was to apply a pessary if the uterus showed any sign of

becoming retroverted, for if taken at this early period a cure can be confidently anticipated. That a retroversion is sometimes caused by a fall on the buttocks, or even on the face is unquestionable—of both of these I have seen several examples—but I do not see how this knowledge affects the treatment. We may tell women that they must avoid falling in either of these ways, lifting heavy weights, or straining at stool. But probably in 999 cases out of a 1,000 this advice would be useless. Hence disquisitions on etiology appear to me to be labour lost.

A knowledge of the frequency of displacement, or malformation in the female population is obviously unattainable. But we can form an approximate idea of their comparative frequency. According to my experience the three states of retroversion, anteflexion and retroflexion stand in the order of frequency as I have named them. Retroversion with anteflexion is so very rare that it may be regarded as a curiosity and scarcely deserving of being erected into a separate class. I have seen but very few cases in an experience of 40 years. Two of these are recorded in my little book on the "Use and abuse of Pessaries," and as far as I know they were the first observed.

Now, given a case of uncomplicated retroversion, in which the uterus is perfectly mobile and capable of being raised into its normal position, either bimanually or by means of the sound I unhesitatingly assert that the only legitimate treatment is that by a properly adapted pessary. I protest against the statement of a well-known operator that "the only place for the pessary is the back of the fire." Such a statement can only be the outcome of profound ignorance of the subject. The mania for surgical interference, which characterises the present-day gynæcology, the ignorance prevailing with regard to the principles of the treatment by the pessary, and the want of skill in its application, have blinded men to the justice of this simple proposition which I have laid down, and we read of hundreds of cases of operation by individual operators, such as shortening the round ligaments from without or from within the peritoneal cavity, ventro-fixation and vagino-fixation. If I could have brought my conscience to the point of persuading my patients to submit to any one of these operations, I also should have been able to reckon them by hundreds. But I have never done so. Alexander's operation never appealed to me because of the fact that when the uterus is pulled down, the last structures put on the stretch are the round ligaments, while ventro-fixation placed the uterus in an unnatural position, and vagino-fixation appeared to me an outrage on common sense. On the contrary, there is no branch of my work

that gives me more satisfaction than the use of the pessary in cases of uncomplicated retroversion of the uterus, and for these reasons, viz.: the absolute *absence* of danger, the relief which it gives in all cases when properly applied, and the prospect of cure in a large majority of the cases. It is no valid argument against its use that the pessary has to be worn for many years. The same objection may be urged against the wearing of a set of artificial teeth, and with much more justice.

The time required to effect a cure will be in proportion to the duration of the displacement. Striking examples establishing this proposition are afforded by the cases of recent occurrence to which I have already referred, viz., from falls, and in which relief was immediately obtained and a cure effected within a year, as well as in the following case very briefly related. A former patient of mine (1890) was cured of uterine congestion, and a year after the cessation of treatment bore her first child, after having been sterile for four years. After several years of widowhood she married again, and being desirous of having at least one child more—for her husband's sake—again sought my aid in January, 1896. The uterus was in perfect position and free from congestion, but the cervix was hard and the canal contracted. Under a course of treatment by graduated bougies the canal became patulous, and in due time she became pregnant. She had a very good confinement, but immediately on getting up she began to suffer great discomfort and even pain in the pelvic region. An appeal to her medical attendant was without avail, and as soon as she could travel she came to town. Examination revealed a well-marked retroversion. The application of a pessary gave her immediate relief, and in a year I removed it. Six months afterwards the uterus was in perfect position.

The majority of my patients come after many years of suffering, some—I may say most—of them having worn pessaries (up to as many as seven) of various kinds and sizes, others only subjected to medicinal treatment. I have a large number of pessaries duly labelled, as examples of completely successful treatment, *i.e.*, cure; but I have, or have had till recently, a very much larger number illustrating unsuccessful treatment, removed from patients to whom I have been able to afford relief. These examples illustrate the ignorance prevailing with regard to the principles of treatment. To say that a man who puts a pessary into a woman's vagina merely because she has symptoms referable to the pelvic region is ignorant of first principles is a self-evident proposition. And yet how many of these cases have I seen! Given a genuine case of retroversion it

is necessary to understand the principles of treatment. In all cases of retroversion there is a certain amount of descent of the uterus. In a well-marked case the cervix will be found close up behind the pubes, in the axis of the vagina, with the os pointing to the outlet, so that the examining finger passes straight into it (if dilated). In extreme cases the os even points upwards as the patient lies on the back. The vagina is shortened in proportion to the amount of descent. The first principle, then, is to restore the uterus to its normal position, and despite all that has been said against the use of the sound, I maintain that it is the best means for this purpose. In a few cases, when the abdominal walls are very thin and lax, it may be possible to effect the restoration by the bimanual method, but even in these the proceeding gives much more pain than the sound. By means of this instrument the uterus can be raised till the fundus touches the anterior abdominal walls without the possibility of injury, provided the cervix be supported by the finger guiding the sound. For this purpose the sound should be well bent, not curved near the point as is usual, but as in the illustration. In all cases it

is essential that the bladder should be empty. Then the sound is withdrawn, and, while the cervix is pressed backwards and the fundus forwards, the intestines are pushed well down behind the uterus, and the organ is left in a state of exaggerated anteversion. The pessary is now applied, and if the sound again pass in the normal direction we have proof that the normal position is maintained. I may here add that this exaggerated position of anteversion has never, in my experience, caused any symptoms.

While it is of the first importance that the uterus be thus placed in its proper position, it is equally necessary that the form of the vagina should receive our attention. The restoration of the uterus to its proper position restores the vagina more or less to its normal length. Now the object of the pessary must be to maintain these two effects. The mode of action of the pessary has been so often described by Goodell, Schultze and others besides myself, that I need not dwell upon this part of the subject. To put in a pessary without first restoring the uterus to its proper position, in the hope that it

will effect that object, has been sufficiently condemned by other writers. Schultze is very emphatic on this point, for he says "no pessary in existence can do this; the normal position must first be restored."

Now it must be remembered that the vagina is a collapsed tube—not an open tube or pipe as authors continually represent it even at the present day—flattened antero-posteriorly, with the two surfaces in close apposition and closely embracing the cervix. This is admirably illustrated by Hart and Barbour. Therefore it follows that any instrument which separates these surfaces to that extent distorts the vagina. Hence also it follows that as it is not possible to devise an instrument that will obviate this entirely, the best is that which distorts it the least. The forms (and names) of the pessaries that are now, or have been in use, are legion, and while much ingenuity is shown in their construction, very little judgment is exhibited. Careful investigation has shown that the form of the vagina may be represented by a thin section through the middle of a pear, the stem end being towards the vulva.

The instrument then which most nearly meets the requirements of the case is the Albert Smith modification of Hodge's pessary, than which I do not believe it possible to devise a better, and when made of material that can be readily moulded to suit the necessities of each case we have all that we can desire. The figure-of-eight pessary has these disadvantages, that if the cervix be enlarged, as it frequently is, it gets strangulated in the posterior opening, and the walls of the vagina are kept too far apart where the limbs cross one another favouring the accumulation of discharge. This applies to all the others in varying degree. I think I am justified in calling the "ring" pessary the "abomination of abominations." Yet I am told that it is sold by the gross where all other varieties are sold by tens. From its tendency to resume its circular form the effect of this instrument is to shorten the vagina, and thereby continue the descent of the uterus, and to keep the naturally opposing surface widely asunder, etc. Hence we need not to be surprised that the men who use this instrument never meet with a case of cure, and therefore form a low estimate of the value of the pessary. It is *impossible for a ring pessary to cure* a simple case of retroversion. Until recently I had a very large collection of these pessaries ranging in size from the smallest to $4\frac{1}{2}$ inches in diameter. Their removal was always attended with the escape of a more or less copious discharge, often offensive. I am surprised to find that this form still finds

favour with the writers of the two papers I have referred to at the beginning. Under the same condemnation comes Fowler's pessary, and if it be possible to pass a heavier sentence I select the cup and stem pessary for it. I have quite recently come across two cases in which this instrument caused intolerable suffering. In one of these only was there any displacement, and in this case the application of a properly fitting Albert Smith-Hodge gave immediate relief, notwithstanding intense uterine congestion.

If ignorance of first principles be answerable for much of the failure to afford relief, or effect a cure by the adaptation of a pessary, want of skill is no less so. From a combination of the two it results that the pessary is often put in doubly reversed, with the infliction of much unnecessary pain. This had so frequently occurred in the case of patients coming from the country that, some years ago, I had to resolve that unless the patient could give me the opportunity of ascertaining the cause of any failure to give relief, I would not undertake the case. Quite recently the breaking of this resolution was attended with distressing circumstances. The patient was a young woman, the mother of one child. She had not been well since the birth of that child, six years ago, suffering from more or less constant pain in the pelvic region, from menorrhagia (for which she had been twice curetted), from dysmenorrhœa, headache, sleeplessness, thoughts of suicide and gastro-intestinal troubles, including obstinate constipation. The application of a cup and stem caused her intolerable suffering, and she was at last told that she must make up her mind to be an invalid for the rest of her life. It was under these circumstances that she consulted me. Examination revealed the existence of retroversion, with general enlargement—probably sub-involution—intense livid congestion of the enlarged cervix, and "erosion" of the circle of the os. After a course of treatment, including the use of a pessary, she had improved so much in every respect, and the uterus was in such excellent position that on one occasion I sent her home without the pessary—as a test. Three days afterwards she began to have her old symptoms, and at her request, though with some misgiving, I sent her the pessary. A great deal of pain was inflicted upon her in the effort to introduce the pessary by means of a speculum, and otherwise. After its introduction not only was there no relief but an actual aggravation of the symptoms. In a state of despair she telephoned to me her condition, and I had to ask her to come up at once—a distance of nearly 200 miles. I found the pessary doubly reversed. Its re-application, without any pain, at once relieved her, and now,

unconscious even of its presence, she looks to the future with confidence.

The authors of the papers referred to are, as I have said, still in favour of the ring pessary. The former actually gives an illustration of an impossible state of things with the ring *in situ* and the latter specifically says, that "in uncomplicated cases of cystocele *and rectocele* a rubber ring pessary usually answers best, whether there be cystocele alone, a rectocele alone, or a combination of the two." I may at once say that a pessary applicable to the treatment of a rectocele has not yet been devised, nor is likely to be, and the only effectual treatment is the restoration of the perineum. It is quite different, however, in the case of cystocele. For this condition we have a perfect support in the diaphragm pessary, which was introduced to the notice of the profession many years ago in my little book, but which appears to have been overlooked. Here is a specimen or illustration.

With this instrument I have obtained excellent results in cases of cystocele and elongated cervix. In one case of the latter in which the cervix had passed through the vulva a lasting cure was effected. The only difficulty attending its use is that it cannot be kept in stock and a model has first to be made out of a Britannia metal pessary with elastic bands across. From this model one is made of vulcanite.

There is a general agreement as to the precautions that should be observed in the use of pessaries. That they are not in every case attended to ought not to be charged against their use, but against their abuse. If these precautions were observed we should not hear of "injuries due to neglected pessaries."

As far as present appearances show it seems hopeless to expect that the age of anteversion pessaries will soon be at an end, or of vaginal pessaries for anteflexion. Yet a moment's consideration of the anatomy of the parts ought to convince any unprejudiced mind that it is impossible to influence for good either of these conditions. Thus anteversion beyond the normal will be

due to something behind the uterus pushing it forward and in such a case the anteversion claims no attention. Anteflexion is in no way influenced by the frequent distension of the bladder, and it is an utter impossibility to exert any pressure on the fundus owing to the intervention of that viscus. As I have already said, anteflexion is not a displacement but a malformation, and must be treated from within. For this purpose the intra-uterine stem—preferably Meadow's combined stem—is often of great service. But seeing that anteflexion *per se* is not necessarily a cause of symptoms until it becomes associated with some degree of obstruction to the escape of the menstrual flow through narrowing of the canal, this instrument now seldom finds a place in my armamentarium. This narrowing of the canal may be only temporary, that is to say during the physiological congestion which characterises the menstrual period, or may be permanent through hyperplasia of the uterine tissue, in which case the internal os will be found to be extremely rigid, so much so as to resist the distensile action of a large laminaria tent for 48 hours. Such a tent I have illustrated in my book—and I have seen many of them when dilating for the purpose of curetting. In these cases the process of dilatation is often accompanied by retching or even vomiting, as it is in the use of graduated bougies. These cases are not suitable for the stem pessary but for gradual dilatation. Did time permit I could give some striking examples of this effect, and I may now state that I have long given up any cutting operation in their treatment.

When it is said that "at their worst pessaries are capable of producing serious injuries and at their best they have inherent drawbacks," I would ask of what method of treatment cannot the equivalent be said, and with far more justice? The writer of these words has drawn up the following indictment against them, viz., "that there is a tendency to set up irritation resulting in constant leucorrhœa *(which I deny)*, and entailing the necessity for regular douching; there is the necessity for examination at more or less frequent intervals *(to which I give a qualified denial)*, which most women naturally find objectionable *(yes, when as I have heard, some men are in the habit of removing the pessary for every menstrual period)*, there is the uncertainty of results, and, lastly, in favourable cases there is the prospect of a woman having to wear a pessary for ten, fifteen or twenty years." Apart from the fact that this indictment shows a lamentable want of appreciation—to put it in the mildest way—of the proper use of the pessary, how does this indictment compare with that which can be brought against his

"more excellent way," viz., either of the various operations which have been devised, and are now so frequently resorted to for the relief of uncomplicated retroversion? I refer you to the recent report of Professor Oui, read before the recent Congress of Gynæcologists at Rouen, on the influence of these operations on pregnancy alone.

Now, I am not aware that there is on record a single case in which a woman has lost her life through the use, or even the abuse of a vaginal pessary. On the other hand, what a tale of disaster could be written with regard to the operations I have referred to! Failure in every respect has attended them; immediate failure by death of the patient; failure to effect a cure, or relieve the symptoms; abortion as the result of the imprisonment of the uterus; rupture of the uterus from the same cause; the necessity for Cæsarean section in the cases of women who have previously had normal confinements, and in a considerable number of cases return of the displacement after a succeeding pregnancy; and finally the need of a second operation to remove the effects of the first. Do not suppose that I am drawing upon my imagination for all this. It is all too true. I say that an operation which is certainly not one of necessity which cannot even be said to be one of expediency, which involves so much risk of life and actual disaster and which places the uterus in an *unnatural position* is not a justfiable one. At least that is the opinion I have long held, and now with increased tenacity in view of extended results; for my estimate of the sanctity of life has prevented me from adopting the practice even in a single case, seeing that I have been able in a vast majority of cases, to afford relief by a perfectly harmless procedure. Some of these operations have already been rejected, notably Mackenrodt's operation of vagino-fixation—an example of "the remedy being worse than the disease"—and each individual operator declaims against the methods of the other.

When a retroversion is complicated by adhesions, inflammatory states of the appendages, or tumour in the uterine wall, it is not the version that calls for treatment but the complicating condition. Yet say that an operation which is certainly not one of necessity, which have met with unexpected and most gratifying success from the use of the pessary. Did time permit I could give the details of a case of retroversion complicated by a fibroid tumour of small dimensions, just short of being imprisoned in the pelvis, in which a pessary retained the uterus in position until the disappearance of the tumour coincident with the menopause left the uterus in its normal place. This patient wore the same pessary (Britannia metal) throughout.

Had this patient any reason to complain of having had to wear a pessary for more than ten years? I trow not.

The pessary is an important aid in the treatment of sub-involution so often associated with, if not due to the retroversion. In the case of retroflexion properly so called, or as I have defined it, no vaginal pessary can be of any service in undoing the flexion, for the reason that it is impossible to afford direct support to the fundus by its means. In these cases, which, by the way, are very rare, the instrument I use is Meadow's compound stem, and it is remarkable that menorrhagia, which so frequently accompanies this condition, is not only not aggravated, but actually benefited by it. That many cases of retroversion of long standing have some amount of flexion super-added is unquestionable, from long-continued intra-abdominal pressure on the anterior surface. But these are essentially retroversions. This posterior flexion appears to me to constitute a strong argument against the current doctrine that anteflexion is the normal form of the uterus. In a case of true retroflexion a vaginal pessary simply aggravates the flexion by doubling the uterus still further upon itself.

Now arises the question, Of what material should the pessary be made? The rubber or celluloid-covered wire, the vulcanite, and Britannia metal, all find their advocates. The pessaries I have had to remove most frequently and accompanied by the most offensive discharge have been the first-named. The idea of putting a cushion on the posterior crossbar, filled with air or glycerine, to support the fundus not only shows an ignorance of the action of the pessary, but is a physical mistake; for, in a short time, the cushion collapses and presents a horribly corrugated surface, with what result I need not describe. I am informed that these cushions are now filled with gelatine, but that does not alter the principle. The vulcanite is open to only one objection, viz., that it is very difficult to alter the shape, and, as Marion Sims said, "the man who is not a mechanic should not trust himself to use a pessary." I have tried the celluloid, which finds so much favour with Schultze and his followers, but others as well as myself have found that it does not retain its shape unless nearly straight. The most suitable and convenient material, according to my experience, now extending over a period of about forty years, is the Britannia or white metal. The shape is most readily altered and is retained, and the metal itself offers this advantage that it gives notice of the presence of any irritating muco-purulent discharge, by becoming more or less black. It is also very easily cleaned and polished, and can be worn for years. Were

it not for the difficulty of moulding it the best material of all would be aluminium on account of its extreme lightness and non-liability to corrosion by any discharge. But this difficulty and the cost militate against its more general use.

I have now shown that the pessary when properly used, and not abused, involves no danger whatever, but is worthy of our full confidence, that the charges that have been brought against it cannot justly be sustained; that in its results it compares most favourably with the operations which have been substituted for it, and that it is an entire misrepresentation of the case to say that "the operative measures" to which I have referred "do all and more than all that pessaries can do without their manifold drawbacks and risks."

If I had done nothing more than afford the relief which the pessary has enabled me to give I should now feel that my professional life had not been ill spent, and if I have failed in some cases I have at least the satisfaction of having done no harm. I may have used some strong expressions in the course of this communication. If I have done so it has been from a sense of duty, and if I had a hundred tongues I should use them for the purpose of trying at the least to put a curb upon the frequency with which the operations to which I have referred are performed.

Three Cases of Intestinal Obstruction following Operations for Fibroid Tumour of Uterus, with special reference to the choice of Operation.*

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The occurrence of intestinal obstruction after an abdominal operation necessitating the re-opening of the abdomen, is a complication so serious to the patient, and so disappointing to the operator, that no apology is needed for bringing these three cases, which have occurred in my own practice, before this Society. It is hoped that a discussion on this important subject may throw some light on the causation, and may suggest the best means of preventing adhesion of bowel. It would be interesting also to hear the experiences of other Fellows as to the frequency of this accident—if I may call it so—in their surgical work, in order to show whether there is or is not a special liability to the occurrence of dangerous bowel adhesions after the operation of supra-vaginal hysterectomy, which has been so generally practised during recent years.

I will first give a short account of my three cases of obstruction, two of which occurred after supra-vaginal hysterectomy, and the third case occurred after myomectomy for a large tumour of the uterus. In all three cases the abdomen had to be re-opened.

Case 1. Single woman, aged 23. Had suffered from menorrhagia for a year, and had noticed a swelling in the abdomen gradually increasing during the same period. On examination the patient had a smooth firm symmetrical tumour reaching up to one inch above the umbilicus. The uterine canal was lying in front of the tumour.

The abdomen was opened on 6th May, 1902. The tumour was seen to be growing from the posterior wall of the uterus which, with the Fallopian tubes was clearly defined. As the patient was only 23 years of age it was decided to do a myomectomy. Two flaps were therefore cut from the base of the tumour, and after enucleation of the tumour the flaps were brought together by fine silk sutures. The fibroid tumour removed weighed 2 lbs. 14 ounces.

On 7th May, general condition good.

On 8th May, patient had troublesome vomiting, and was put on rectal feeding.

* Read at a meeting of the Obstetrical Society of London, December 7th, 1904.

On 9th May, pain and retching continued. No result after castor oil, calomel, and saline. Some flatus passed after turpentine and gruel enema. Slight distension; pulse 120. At *10 p.m.*, patient seen again; not so well; vomit thick and brownish. Decided to re-open; old incision opened up; some blood-stained fluid escaped on opening the peritoneum. On passing hand down into the pelvis a knuckle of small intestine was found adherent to the back of the uterus. Below the knuckle the intestine was collapsed, above it was distended. The dilated portion was punctured in two places and a large quantity of fluid contents evacuated. After this, half an ounce of sulphate of magnesia was injected into the bowel. The wound was then closed.

On 10th May, sickness entirely ceased. Later on she had 2 ounces of Haustus Sennae Co, followed by turpentine enema with good results. Patient subsequently made an uninterrupted recovery.

Case 2. A.D., single, aged 46, was admitted to St. Thomas's Hospital on the 9th December, 1903. Patient was an anæmic-looking woman, who had always suffered from menorrhagia, but during the last seven years the loss had been more profuse, and especially so during the last 12 months. For two years patient had noticed a lump in the lower part of the abdomen, and had suffered from pain in this region. On admission the patient had a firm, solid tumour reaching half way up to the umbilicus. The cervix was high up and directed backwards. The anterior fornix was depressed by a hard, round mass continuous with the abdominal tumour. There was a certain amount of mobility.

On 18th December laparotomy was performed. The ordinary supra-vaginal amputation of the uterus was performed—two small flaps consisting of peritoneum and a small quantity of underlying muscular tissue being dissected from the lower uterine segment, and the uterus and tumour removed. The flaps were united after the manner of Lembert with fine silk sutures. The tumour removed in this case was a diffuse adenomyoma of uterus, one of the cases I exhibited before this Society in the early part of this year. After the operation the patient had very slight shock, but the same evening the temperature rose to 100·8. For the first week after the operation she made satisfactory progress, and did not give any special anxiety. The temperature this week varied between 98·4 and 100·4. Pulse rate fluctuated from 88 to 100 per minute. The patient improved in colour and felt well. The bowels were opened with castor oil and enemata.

On the 25th December, i.e., a week after the operation, the

temperature began to rise, and patient complained of pain in the left side of the abdomen low down.

On the 26th temperature rose to 103·8. The sutures were removed and on the next day the temperature fell to 98·4. In spite of the fall of temperature, the pulse rate rose to 126, and remained rapid.

On the 26th December ʒi. of magn. sulphate was ordered every hour, followed by enemata, without result. There was now a good deal of abdominal distension, and on the evening of the 26th patient began to be sick. This continued on the 27th December and the patient was put on rectal feeding. On the next day the distension was still marked, and the pain and tenderness below and to the left had increased. The general condition of the patient at this time looked very grave, and the evidence of obstruction being quite definite it was decided to re-open the abdomen. The patient's pulse at this stage was 140 and the temperature 99·6.

On the 28th December an incision was made to the left of the old scar through the outer edge of the rectus. On opening the peritoneum several coils of bowel were found firmly adherent to the uterine stump. There was a collection of inflammatory exudation on the left side in the lower abdomen which was tracking up to the left loin. The coils of bowel in this region were in many places covered with lymph. The bowel was separated from the uterine stump and the abdomen was thoroughly washed out—a counter opening being made in the left lumbar region to ensure drainage. A tube was placed in the abdominal wound and a gauze drain in the loin. The patient bore the operation well, but strychnine was given every four hours after the operation as a prophylactic against shock. On the evening of the operation, a turpentine enema was given which was followed by the passage of some flatus. On the following day an olive oil injection followed by a soap and water enema was given with fair result.

On the 30th December patient looked and felt much better. Pulse 110. Temperature normal.

On 31st December bowels acted well after aperient. Patient still suffered a good deal from hiccough. From this time onwards the patient made a slow recovery. There was a good deal of troublesome constipation, and the tympanites took some time to subside. Eventually, however, she made a good recovery and was discharged from the Hospital on the 19th February.

Case 3. A.M., aged 22, was admitted to St. Thomas's Hospital 6th April, 1904. Patient had a normal confinement on 10th March, 1904. On the sixth day of the puerperium the temperature rose to

100°F., and a large tender swelling was found in the lower abdomen. About three weeks later a second tender swelling was discovered in the right iliac region. Patient had continued in bed, the temperature fluctuating between normal and 100°.

On admission to the Hospital, patient was very anæmic and sallow complexioned. There were two well-marked elastic tumours—one in hypogastrium, and the other in the right iliac region separated by a sulcus. The cervix was high up and far back, being situated between the two tumours. It was thought probable the tumours were dermoid cysts of the ovary.

On 14th April, 1904, the abdomen was opened. The tumour proved to be a bilobed fibromyoma of uterus, one lobe occupying the anterior wall of the uterus, the other lobe growing between the layers of the right broad ligament. An attempt was first made to enucleate the tumours, and this was accomplished, but owing to the large sac left after removal, into which there was considerable oozing, it was thought best to perform supra-vaginal hysterectomy. The uterine tissue was still very soft, and the sutures had a tendency to cut through. The tumour removed weighed 1lb. 9oz. and was undergoing marked necrotic change.

The operation was performed on the 14th April and patient had no shock or other discomfort till the evening of the 17th. The bowels acted well after castor oil on the morning of the 17th. On the evening of the 17th patient began to have abdominal pain and commenced to vomit. She rapidly began to look pinched and to have the typical abdominal facies. On the morning of the 18th she looked very ill, temperature 97, pulse 130, constant vomiting—no result followed administration of enemata. Drachm doses of sulphate of magnesia were ordered hourly without result. At 5 p.m. the same day, as there was evident obstruction, I re-opened the abdomen by a small incision to the left of the former one. There was a small quanitity of serum on opening the peritoneum. On passing the finger into the abdomen, a firm band of omentum was at once felt adherent to the stump, tightly stretched, and constricting a coil of small intestine. This was readily separated, ligatured and removed, and the wound closed.

On the 19th, i.e., the day after the operation, the aspect of the patient had resumed its ordinary placid character. There was a good result after magn. sulphate, and she subsequently made an excellent recovery.

These are short accounts of the three cases, which have made a very great impression on me. The occurrence of three cases of intestinal obstruction following on, and the immediate result of a particular operation, is an extremely grave matter. It is true that all my cases recovered, but such occurrences add so greatly to the anxieties which every operator is bound to experience who is engaged in abdominal surgery, that if we can by any special technique or by choice of operation minimise the risk of this particular complication, we shall at any rate be relieved of one of the most disappointing and dangerous sequelæ which may follow a successful operation.

I may say that up to a few months ago, I have practised the operation of supra-vaginal hysterectomy in nearly all cases of fibroids requiring surgical treatment, which have come under my care. The anterior and posterior flaps have been brought together over the cervix by a series of interrupted sutures of fine silk. With the results of this operation on the whole, I have been very well satisfied. Up to November of this year I had performed 162 abdominal operations for fibroids; 130 of these have been supra-vaginal hysterectomies, 12 have been panhysterectomies and 18 have been myomectomies. Putting aside the 12 panhysterectomy operations, the three cases of obstruction occurred in 150 cases.

Can one offer any explanation for this?

Is it due to the technique of the operation?

Is it due to the nature of the operation?

So far as the technique is concerned I have been in the habit of bringing together the flaps over the stump with a series of interrupted sutures of fine silk introduced in Lembert fashion. It is possible that a reliable absorbable ligature, such as can be obtained at the present day, would be an improvement on fine silk, and a continuous suture bringing together the peritoneal flaps would do away with the possible source of irritation to the peritoneum which the series of knots in the interrupted suture presents. The more nearly we can restore the peritoneum of the operative area to its natural smooth, unbroken state, the less is the risk of troublesome adhesions. One knows well enough that in a large number of cases after abdominal operations, adhesions must occur, but the adhesions are of such a kind that the natural peristaltic action of the bowels is not interfered with. I am inclined to think that in my cases of intestinal obstruction following the supra-vaginal hysterectomy, the slightly projecting stump of different consistence to the rest of the pelvic peritoneum, covered by a row of sutures, or the sutured uterus after myomectomy, were important factors in the causation, and one is

drawn to the conclusion that these two operations for fibroids leave the site of operation in a condition which may predispose to troublesome adhesions, which may be followed by obstruction.

Sloughing of the flaps covering in the stump has been reported to occur in certain cases after supra-vaginal hysterectomy. It is easy to understand, if this is so, how bowel adhesions very readily under these circumstances occur, followed by obstruction or by fatal peritonitis. I do not, however, think that this can be anything but a very rare complication. I have never seen anything suggesting it in any of my operations, and in the three patients in whom I had the opportunity of re-opening the abdomen and examining the stump, there was no evidence of any necrotic change.

I have not yet performed a sufficient number of panhysterectomy operations to compare results with those of the supra-vaginal operations. The thin peritoneal flaps closing the pelvic floor below, and leaving the surface almost absolutely smooth and free from irregular projections, must be less likely to cause adhesions, and seem to me to be an important point in favour of the panhysterectomy operation. Another point which makes one think that the nature of the operation is a factor in the causation of the obstruction is the freedom from such troubles in other abdominal cases of a similar nature.

After ovariotomy operations difficulties with the bowels are in my experience hardly ever met with. Then again, after vaginal hysterectomy, I have only on one occasion met with intestinal obstruction in a series of considerably over one hundred cases. In this particular case the patient was going on quite satisfactorily, and on the third day the vaginal plug was removed. Later in the day, the patient complained of pain and began to vomit. I saw her the next morning, and on vaginal examination found a coil of small intestine in the vagina. This was replaced, and another plug of gauze introduced. Distension of the abdomen rapidly increased with vomiting, and this case terminated fatally.

After operations for serious suppurative disease in the pelvis, where raw surfaces denuded of healthy peritoneum are necessarily left, a certain number of unfavourable results from extensive bowel adhesions are almost certain to occur as an inevitable result of the operation. In clean cases, however, one must consider that intestinal complications following on operations are to a great extent preventable, and where they do occur, it behoves us to search carefully for an explanation. Taking clean abdominal cases such as operations for ovarian tumours (non-suppuratory) and uncomplicated fibroids I have come to regard the operations of supra-vaginal

hysterectomy and myomectomy as peculiarly liable to be followed by dangerous adhesions of bowel. I should be interested to know whether the Fellows of this Society have met with any cases of these complications after these two operations, in which they have been called upon to re-open the abdomen, or in which intestinal obstruction has been the cause of death.

The diminished liability to bowel adhesions is, I believe, one important advantage for the panhysterectomy operation. Before deciding to substitute one operation for another one must first consider the various advantages or objections. A great deal has been written and opinions have been very freely expressed on the relative merits of the supra-vaginal and total hysterectomy. It has been suggested that patients suffer more from shock after panhysterectomy. In the large proportion of cases operated upon patients do not suffer any serious shock after either operation. There are three important factors on which shock depends in operations on fibroids; one is the prevention of hæmorrhage, the second is the duration of the operation, and the third is the careful packing of the intestines with hot gauze sponges, so as to prevent exposure. Where hæmorrhage is well controlled, and the operation not unduly prolonged, shock is rarely seen.

In certain cases when there is serious inflammatory mischief of the uterine appendages, which is not by any means uncommon in fibroids impacted in the pelvis, I should suggest that the supra-vaginal hysterectomy is an easier operation, and one of less risk to the patient. In these cases the cervix is often deeply situated, surrounded by a good deal of cellulitic thickening which prevents it from being drawn up, and very troublesome hæmorrhage is likely to occur during the removal of the cervix. For some of these cases the supra-vaginal operation still has a place. Where, however, the complete extirpation of the uterus does not increase the risk of the operation, I intend in future always to select it.

A good deal has been written about the risk of injuring the ureters in the operation for complete extirpation of the uterus. In the whole of my operative work in cases of vaginal hysterectomy, and in the twelve cases of abdominal panhysterectomy, I have never met with this accident. When the peritoneum and bladder have been separated from the cervix and the uterus drawn up, the ureter becomes still further removed from the field of operation. Although in abdominal operations for cancer of uterus when the cellular tissue is extensively removed injury to the ureter is a serious factor; in operating for cases of fibroids, injury to the ureters ought not to occur where proper care is taken.

With a view to diminishing the risk of injury to the ureters, I see Mr. Bland-Sutton suggests leaving a shell of cervix, and merely removing the mucous membrane of the cervical canal, and the surrounding tissue of the cervix. It seems to me that scooping out the cervical canal in this way is exceedingly likely to be followed by troublesome oozing from the walls, and I do not think it has any advantage over the complete extirpation.

The opinion was expressed by Dr. Lewers in this Society that when a small portion of mucous membrane of the lower segment of the uterus is left with the cervix, the patient may continue to have a monthly discharge of blood, and she may not suffer to the same extent from the sudden cessation of menses which is caused by removal of the uterus. This is a point which it is very difficult to prove satisfactorily, as the amount of discomfort caused by removal of the uterus in different patients varies so greatly.

One case which occurred in my own practice a couple of years ago, shows the disadvantage of leaving a small portion of the lower uterine segment. The patient, who had been losing very excessively for nearly two years, had supra-vaginal amputation of the uterus performed on 17th July, 1902. The fibroids were adherent in the pelvis, which made the operation a very difficult one; the left ovary and tube were removed, the right ovary was left. The patient left the hospital at the end of a month, but very soon the discharge returned, and the continuous bleeding quite prevented her from going back to her domestic duties. Some months later she returned to the hospital and I removed the cervix with uterine stump *per vaginam*. After this she made a good recovery. This case shows the possible disadvantage in leaving a portion of lower segment of the uterus.

I do not propose in this paper to discuss the question of carcinoma occurring in the cervix after the supra-vaginal hysterectomy. Suffice it to say that so far as it occurs, it is an argument in favour of the complete operation of panhysterectomy.

In conclsion, I would like to ask the Fellows of this Society for their own experience with regard to obstruction following operations for fibroids. I would also suggest that in the large bulk of cases the immediate risks of supra-vaginal hysterectomy and panhysterectomy are equal.

Where fibroid tumours are complicated by extensive inflammatory disease of the uterine appendages, I maintain that supra-vaginal hysterectomy still holds a place, as being in many such cases a less serious risk to the patient. In all other cases, both from the point of view of immediate and ultimate results, panhysterectomy is the operation of selection.

CRITICAL REVIEW.

The Heart and Circulation in Pregnancy.

By H. Oliphant Nicholson, M.D., F.R.C.P.E., *Assistant Physician to the Royal Maternity and Simpson Memorial Hospital; Obstetric Physician, New Town Dispensary, Edinburgh.*

Ever since Larcher, as a result of his observations in the Paris Maternity Hospital in 1825 and 1826, asserted that the heart is normally in a state of hypertrophy during gestation, the whole question of the influence of normal pregnancy upon the maternal cardio-vascular system has received a large amount of careful investigation at the hands of numerous observers. Larcher[1] made 130 autopsies on women, whose ages varied from eighteen to thirty-five years, the great bulk of whom succumbed to puerperal fever—no lesion having preceded or given rise to the condition of the heart found in them. He did not weigh the hearts or take their measurements, and he seems to have merely formed the general impression that the walls of the left ventricle were considerably thickened, by at least from one-fourth to one-third; that the texture was also more firm, and the colour more bright. He thought that the right ventricle and the auricles retained their normal thickness. Thus from his estimate of the thickness of the ventricular walls in these cases, as compared with the figures given for the normal female heart by Laennec, Larcher felt justified in assuming that the heart became markedly hypertrophied in pregnancy.

These observations, although made in 1825–26, were not fully published till 1859, and the conclusions seemed to receive confirmations from subsequent work carried out by Ducrest, who measured the hearts of 100 puerperal women between twenty and thirty years of age, and found even his minimum greater than Bizot's figures for the normal female heart.

In the forty-five years that have elapsed since the publication of these views, many important contributions have been made to the scientific study of this question by workers of all nationalities, with the object of determining the comparative weight of the heart in the pregnant and the non-pregnant woman. And yet it must be generally admitted that the matter is still far from being definitely

settled. The question as to whether the heart does or does not undergo hypertrophy during pregnancy would seem, at first sight, to be one upon which there should be no special difficulty in pronouncing a final decision. Unfortunately, however, the evidence, derived both from standard methods of weighing and measuring the heart, its walls and cavities, as adopted by Müller[2] and Dreysel,[3] and also from the results of physical examination of the organ (percussion and auscultation) as studied by Duroziez,[4] Gerhardt,[5] and others, is, for many reasons, unreliable. The cases of pregnant and puerperal women that come to the *post-mortem* room are frequently complicated in such a way as to render the data untrustworthy, and the methods employed in weighing and measuring the heart are often liable to yield fallacious results.

With regard to the physical examination of the heart in pregnancy it is evident that an increase in the cardiac dullness with displacement of the apex beat cannot be accepted as proof that hypertrophy has occurred. Duroziez claimed to be able to demonstrate a definite increase in cardiac dullness in women towards the end of pregnancy, and stated that the area of dullness became normal on the first day after labour; he even went the length of demonstrating a recurrence of the dullness on the second day, and a greater enlargement on the following day, as lactation occurred. Duroziez apparently ignored the effect of compression of the heart by the uterine tumour acting through the diaphragm, and it did not occur to him that the cause of the increased area of dullness to the left of the sternum might really be due not to an enlarged ventricle, but possibly to the displacement of the whole heart upwards and anteriorly.

Recently Stengel and Stanton[6] in a valuable contribution to the study of the heart in and after pregnancy, have thrown fresh light on this matter. Their observations were entirely clinical, and embraced physical examinations before and after labour, with determination of blood pressure and sphygmograms. While admitting the difficulties encountered in percussion of the outlines of the heart, on account of the great increase in the size of the breasts and the alteration in the shape of the thorax, still they consider that they obtained satisfactory results. The comparative outlines of the heart before and after labour showed the altered conditions represented in the accompanying illustration (Fig. 1). The authors mapped out the cardiac dullness in fifty women, of whom 39 were primiparæ and 21 multiparæ, and the details regarding these examinations are fully given in tabular form. From a very complete and painstaking study of both heart and blood pressure in these cases, they conclude that

there is not during pregnancy any hypertrophy of the left ventricle, nor any special increase in its work. The increase in dullness toward the left is, in their opinion, explained by the fact that the diaphragm is lifted up, and consequently the heart is displaced in an upward and outward direction. The comparative outlines of the cardiac dullness, show there is a rapid return to the normal position after labour. These authors frequently noted an increase in the extension of dullness toward the left in the second and third interspaces, in which area marked pulsation was often present. Over this area, also, a systolic murmur was sometimes heard, and the lung substance did

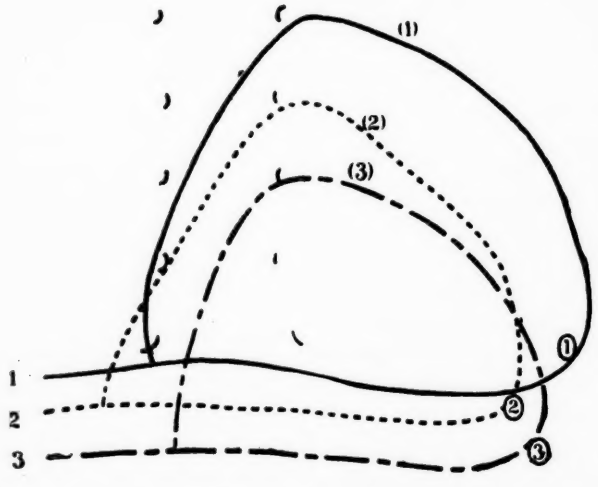

FIG. I. Outline of heart dulness before labour (1), immediately after labour (2), and two weeks later (3). The position of the suprasternal notch, intercostal spaces at the sternal end, and the xiphoid junction are indicated as landmarks.

not seem to be displaced; hence the conclusion is that this state of things is explained by a distension of the conus arteriosus and root of the pulmonary artery.

Thanks to the brilliant researches of Dr. James Mackenzie[7] regarding the significance of waves of blood thrown back by the right auricle and ventricle into the jugular veins—venous pulsations—it is now possible to recognise in a precise manner the changes that take place in the right side of the heart during pregnancy. These changes will be fully referred to later; meanwhile it may be stated that, even in normal pregnancy, both auricle and ventricle are liable to become

very considerably dilated. Then with increase of the heart's size, it often happens that it is the right ventricle which is felt beating under the left nipple. This being so, a different interpretation might be put upon the extension of dullness and pulsation described by Stengel and Stanton, and they are satisfied that during the later months of pregnancy some continuous dilatation of the right ventricle does occur, though only to a very moderate degree. This dilatation they ascribe to the upward displacement of the diaphragm, and to pressure upon the lungs, increasing the difficulties of the pulmonary circulation.

Thus it appears that while the majority of writers, if not all, admit that there is a gradual enlargement of the heart during pregnancy, still many are not convinced that the left ventricle undergoes hypertrophy. The present writer thinks that the evidence, both anatomical and clinical, in favour of some hypertrophy is overwhelming, but the extent to which it occurs must be dependent upon a great variety of factors.

The physiological changes incidental to pregnancy are very numerous and occur very rapidly. In a few months the uterine muscle undergoes enormous hypertrophy, and there is also greatly increased growth in many of the glandular structures of the body. Hence during this period it would be somewhat remarkable if the heart did not likewise pass through a hypertrophic evolution. It has for long been known that the uterine functions are intimately connected with the organs of circulation, and Wardrop,[8] in 1851, directed attention to certain disturbances of the heart arising sympathetically from morbid conditions of the uterus. More recently Wilson,[9] in a suggestive paper, has pointed out that hypertrophy of the heart may occur as the result of the growth of a fibro-myoma in the uterus, even when the tumour is of moderate size, and moreover that after hysterectomy the signs of hypertrophy disappear. Alban Doran,[10] in a paper dealing with this subject, says that a fibroid in the uterus implies a hyperplasia of the plain muscular fibres in certain areas, the uterus being most involved, whilst the heart suffers to a less degree. Another point of view, if we bear in mind the well-established relationship between disease of the kidneys and hypertrophy of the left ventricle, suggests the question whether certain renal disorders dependent on pregnancy—quite apart from the so-called "pregnancy kidney"—may not exert some direct influence upon the heart. In some cases Bright's disease developes during pregnancy, and then the cardio-vascular changes associated with it are well marked; but, apart from actual disease, it

is upon the kidneys that the strain of pregnancy chiefly falls, and perhaps their temporary failure in function is a factor that calls forth a certain amount of cardiac hypertrophy.

A heart which has undergone hypertrophy should display increased action, and should be capable of performing additional work without over-strain, but certain facts established by Mackenzie, which will be referred to later, seem to point to a distinct inefficiency of the organ as a whole. Therefore in these cases one can hardly call the hypertrophy compensatory, in the sense that it enables the woman to exert herself with the freedom she possessed before conception, and yet the rate and character of the radial pulse often point strongly to the fact that the left ventricle, at least, is endowed with increased activity. Whether or not, for this and other reasons, one is entitled to assume that hypertrophy of the left side of the heart has taken place, is the question upon which opinions differ; but as Mackenzie has shown, what certainly does occur quite early in pregnancy, is dilatation of the cavities of the right heart.

In a paper published in 1903, the present writer referred to this paradoxical state of matters in connection with the heart of pregnancy—a slow and full radial pulse, quite consistent with a left ventricular hypertrophy, in combination with a large pulsation in the jugular veins, giving infallible evidence of dilatation of the right side of the heart.[11] A consideration of the probable causes of this remarkable combination of circulatory phenomena in pregnancy may lead to a true conception of their meaning. Clifford Allbutt [12] in an argument in support of the toxic theory of puerperal albuminuria, suggests that in pregnancy there is retained in the system some material which causes a widespread constriction of the arterioles. He pointed out that in the toxæmia of lead poisoning extreme vaso-constriction occurs, and that many of the symptoms of this condition are remarkably similar to those which develop when the chronic renal disease of pregnancy is present and pre-eclamptic symptoms make their appearance. That there is some powerful vaso-constricting substance circulating in the blood as a result of pregnancy would provide a reasonable explanation of the circulatory phenomena already referred to, especially if the alterations thereby brought about in the systematic circulation should tend, for some reason, to produce an engorgement of the pulmonary vessels, and hence a great increase of venous pressure. On this view it would seem to be possible not only to understand why the left ventricle should undergo some hypertrophy, but also to explain the significance of the dilatation of the right side of the heart. The origin of this

constrictor substance is at present unknown, and Herman[13] seems disposed to think that it may, like lead, be introduced into the body from without. But in whatever way it gains entrance into the blood it seems to act upon the arteries and arterioles, and probably also upon the heart, in a manner very similar to supra-renal extract, or to digitalis in toxic doses.

Our knowledge of the influence of the supra-renal and thyroid glands respectively upon the arterial calibre has shed some new light upon this subject, and in several communications the present writer has thrown out the suggestion that the supra-renal secretion itself is the vaso-constricting principle; and that, for reasons which are at present obscure, it exerts an exaggerated influence upon the cardio-vascular system in pregnancy. The internal secretion of these glands either becomes too active, or its normal action on the blood-vessels is not sufficiently counter-balanced, owing to a deficiency of the thyroid secretion, with the result that there is a prolonged continuance of arterial and arteriole contraction.

Recent experimental work on the action of adrenalins upon the vascular system by Brodie,[14] and more recently by Dixon[15] and by Drummond,[16] lend support to this view, and at the same time further light is thrown upon some of the hitherto inexplicable circulatory phenomena—dilatation of the right heart, overfilling of the veins, tendency to œdema of the lungs—which have been observed to occur at the very commencement of pregnancy, long before the addition of the placental circulation to the field of work supplied by the maternal heart can possibly operate as a cause. Brodie's observations are of the utmost importance, not only in the interpretation of these early circulatory features occurring in physiological pregnancy, but also because they may give the clue to the mode of production of some of the well-known phenomena associated with the renal diseases of pregnancy, and may even help to solve the riddle of puerperal eclampsia itself.

Adrenalin is known to cause a large rise in the systemic blood pressure, due chiefly to constriction of the peripheral arterioles, and it also acts upon the heart, whose output of blood is nearly doubled. Brodie showed that the effect upon the pulmonary blood pressure is a rise to nearly double its original value, this rise commencing with, but lasting longer than, the rise in aortic pressure. He concludes that these effects are mainly due to the action of the peripheral blood-vessels in causing the large rise in aortic pressure. The adrenalin appears to act upon the blood-vessels through the vaso-motor nervous system, for Brodie found that injection of the drug directly into the

systemic vessels caused an immediate contraction, amounting almost to complete closure; while, on the other hand, direct injection into the pulmonary vessels resulted in a markedly increased rate of flow—an exactly opposite effect. His conclusion is that there are no vaso-constrictor fibres to the pulmonary vessels.

Drummond has studied the histological changes produced by the injection of adrenalin on some of the glandular organs of the rabbit. The action of adrenalin upon the vascular system produces great congestion of the viscera, and while these changes may be partly explained by the alterations in the blood-pressure, they are also due to a direct toxic action of the drug. The most suggestive and important fact is that death is due to an acute œdema of the lungs, which is often accompanied by great congestion of these organs. Drummond ascribes these inflammatory changes in the lungs to the toxic influence of adrenalin. This influence is most distinctly seen in the liver and kidneys; upon these organs adrenalin appears to act as a protoplasmic poison. In the kidneys the cells of the convoluted tubules are chiefly affected, and in the liver the cells of the central zone are the first to succumb. These changes in the liver are very similar to those which have been described in other toxic conditions, such as eclampsia.

Here at the least, are some points which are highly suggestive, not only in relation to the maternal circulation in pregnancy, but also to the toxæmia which sometimes accompanies this state. The toxic influence of the active principle of the supra-renal secretion is outside the scope of this review, but it is evident that this substance, while causing constriction of all the systemic arteries and arterioles, acts in exactly the opposite manner upon the pulmonary vessels, with the result that they tend to become engorged with blood. Under its action the whole venous system becomes overfilled, and the cavities of the right heart become dilated.

Dr. James Mackenzie,[17] of Burnley, to whom we owe the most important contribution that has yet been made to the subject of this review, noted the following series of changes affecting the circulation, which though in one sense abnormal may, in another sense, be considered as incidental to the pregnant state. These conditions were: (*a*) limitation of the field of cardiac response; (*b*) changes in the rate and rhythm of the heart; (*c*) dilatation of the right side of the heart; (*d*) tendency to œdema of the lungs; (*e*) tendency to overfilling of the veins of the legs; (*f*) the occurrence of marked pulsation in the veins of the neck.

Limitation of the field of cardiac response. In a healthy

condition of the organism the calls made upon the circulation by increase of function are readily responded to. But this response has its limits. Hence what Mackenzie calls the limitation of "the field of response" offers one of the most reliable signs of cardiac inefficiency when one observes the manner in which the heart responds to effort. This is generally shown by shortness of breath or attacks of palpitation on such exertion as the individual was wont to perform with the greatest comfort. From the very earliest periods of pregnancy and long before the bulk of the uterine contents calls for an appreciably increased supply of blood or for greater force of the heart's action, it may be observed that the heart is not as efficient as before.

Changes in the rate and rhythm of the heart. According to Mackenzie's observations the rate of the heart is frequently increased in early pregnancy, and palpitation follows more readily upon slight exertion. Changes of position, as from lying down to standing up, produce a more marked increase in the pulse-rate than occurs in the non-pregnant state. Jorisenne,[18] Tuszkai[19] and others on the other hand, maintain that there is as a general rule, a constancy of the pulse during lying, sitting and standing in pregnant women, and regard this symptom as evidence that hypertrophy of the heart has occurred. McKerron[20] examined several women for this symptom in the later months of pregnancy, and his results tended to corroborate this view. Winckel[21] only found a constancy of the pulse in 3 out of 19 cases after the first two or three trials; in all the others the pulse varied with the position. The present writer has tested a considerable number of women, both in early and late pregnancy, and usually found that an acceleration of the pulse-rate followed the change of position; in primiparæ the acceleration was, as a rule, less marked than in multiparous women.

The respiratory movements normally produce a slight quickening of the pulse during inspiration, and a slowing during expiration; in pregnancy this influence of respiration is commonly exaggerated. At some time during pregnancy it is also not unusual, especially in multiparæ, to find a special form of pulse irregularity which is due to the ventricle contracting prematurely. What happens is this. The auricle contracts at regular intervals, and generally the ventricle follows suit in the proper way. But sometimes the ventricle, being unduly irritable, is stimulated to contract from other causes than an auricular impulse. Therefore, after having given its usual contraction in response to the auricle, it goes off a second time during the period in which it should be resting and preparing to receive the

next stimulus from the auricle. In doing so it exhausts itself and is unable to contract when this auricular stimulus comes. Hence the diastolic period, after this premature beat, is prolonged until the next auricular contraction again stimulates the ventricle. The finger on such a pulse misses a heart beat, and the sphygmographic tracing shows a little elevation occurring soon after the full pulse wave, and followed by an unusually long pause (Fig. 2*). These "extra-

FIG. II. Irregular pulse in pregnancy due to an "extra-systole."

systoles" of the ventricle, as they are called, may come at very rare intervals only, or they may occur constantly (Fig. 3).

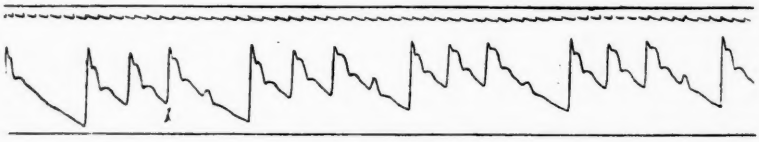

FIG. III. "Extra-systoles" of the ventricle occurring frequently.

Dilatation of the right side of the heart. In the later months of pregnancy there is not only an increase in cardiac dullness to the right of the sternum, but distinct pulsation can often also be noted in this situation. With an increase in size of the uterus the apex-beat may be felt in the fourth interspace. Thus the increase of dullness is partly explained by the fact that the heart is pushed upwards, but it is also due to dilatation of the cavities of the right auricle and ventricle. Mackenzie, from a series of measurements of the chest, made during pregnancy and after labour in a large number of cases, found that the lower chest wall becomes considerably expanded. In some cases the circumference of the chest before delivery was 29 inches, and some days after labour 25 inches.

Tendency to œdema of the lungs. The pulmonary circulation is maintained chiefly by the right ventricle aided by the respiratory movements. Hence the diminished expansion of the chest, as shown by these measurements, tends to make it more difficult for the ventricle to get the blood through the lungs. As evidence of this

* All the tracings illustrating this review are selected from the writer's collection.

embarrassment of the pulmonary circulation in pregnancy, Mackenzie has directed attention to a symptom, the significance of which has not been sufficiently appreciated. He says: "When the patient lies for several hours in bed, the ribs pressed against the bed so that little movement is possible, the respiration is then mainly carried on in the upper part of the chest, and is more shallow. On this account the blood is apt to become stagnant at the bases, and if we examine a pregnant woman towards the end of term we shall find, at the bases of the lung behind, on the side on which she lay, numerous fine crepitations with the first deep inspiration. These crepitations constitute the first sign of the beginning of œdema of the lungs. The crepitations may disappear in the first instance after a deep inspiration; later they do not disappear, and I have frequently found the conditions gradually advance till there was dullness on percussion and absence of breath sounds, and at *post-mortem* examination the lungs were found engorged and sodden with dark blood. In normal pregnancies the condition rarely goes beyond the first stage, but I insist on it here as another sign of the nature of the circulatory changes caused by pregnancy."

This tendency to œdema of the lungs described by Mackenzie as occurring even in the course of normal pregnancy, is an observation full of interest and suggestion in relation to what has been already said about the special action of the supra-renal secretion in bringing about an engorgement of the pulmonary capillaries and a congestion of the lungs; in some cases of pathological pregnancy, *e.g.*, eclampsia, these changes do advance beyond the first stage, and death is sometimes directly due to an acute œdema of the lungs.

Tendency to overfilling of the veins of the legs. This is another interesting circulatory change in pregnancy, which Mackenzie mentions but does not discuss. There are, however, some points in connection with the condition which are worth mentioning.

It is commonly held that pregnancy plays an important rôle in the etiology of varicose veins, and many women assert that they had not been troubled with enlarged veins until during or after pregnancy. Pearce Gould [22] points out that one must be careful, in this connection, to distinguish between conditions causing varix, and conditions leading to pain in varix. Frequently he found that observant women had noted their enlarged veins in early life before marriage, but that they had never been troubled by them until they were pregnant. Often a woman will also say that her veins were only noticed to be enlarged when she "got up after her confinement." One important point is that many women complain of pain in the

enlarged veins of the legs at the very commencement of pregnancy, before the uterus has risen high enough to press upon either common iliac vein; another point is that these pains abate in the later months when the pressure upon the veins, if it really occurs, must be at its maximum. Pearce Gould thinks that large ovarian and uterine tumours are less often attended by troublesome varices of the lower limbs than in pregnancy—a fact which surely points to some other factor as coming into play in the enlarged and painful varices of pregnancy. There is obviously some other explanation than the mechanical pressure of the enlarged uterus to account for the various venous engorgements which occur in pregnancy, and which can sometimes be demonstrated very shortly after conception; the remarkable circulatory changes and vaso-motor phenomena, already referred to, point strongly to the correctness of the view that some powerful constrictor of the arterioles is responsible for the rise of pressure in the veins.

The occurrence of marked pulsation in the veins of the neck. This symptom is not present in all cases of pregnancy, yet it is very frequently present to a greater or less extent. Mackenzie regards it not as an abnormal sign, but merely as evidence that the right side of the heart is dilated. The jugular veins become distended, and waves of blood are thrown back into them by the contractions of the right auricle and ventricle. Clinically, this is the most important of all the symptoms that arise in connection with the circulation in pregnancy, for Mackenzie has clearly demonstrated that from its study it is possible to recognise certain changes that take place in the right side of the heart. These changes—increasing dilatation of auricle and ventricle—are evidenced by definite alterations in the form of the venous pulse, of which graphic records are taken. There are certain features in these tracings which will guide the practitioner as to his action in the management of cases of pregnancy complicated by valvular disease of the heart.

As a means then of interpreting certain changes in the heart's action during pregnancy, in relation to the question of prognosis where mitral disease is present, this symptom of venous pulsation is of the greatest value.

The venous pulse, as it occurs in normal pregnant women, is best observed in the recumbent position. As a rule the pulsation is confined to the internal jugular vein, and as the carotid artery beats in the same situation the pulse in the vein is often mistaken, even by experienced observers, for the beating of the carotid The first part of the venous pulse is due to the systole of the auricle, and it

therefore occurs earlier than the carotid pulse; the collapse of the vein (auricular diastole), which is a more striking feature than its distension, is synchronous with the arterial pulse.

In order to recognise the causes of the individual movements in the venous pulse a graphic record is obtained, and the pulsations are accurately timed by recording them simultaneously with the radial pulse. The radial pulse-tracing is an evidence of a contraction of the left ventricle, and thus serves as a standard to determine the position in the cardiac cycle of any movement in the jugular vein. The apparatus used consists of the ordinary Dudgeon sphygmograph, to which Mackenzie's "clinical polygraph" is attached.

It is necessary to appreciate the nature of the waves in the normal venous pulse before one can understand the variations that occur as the right side of the heart becomes more and more distended. As a rule tracings from the jugular vein—unless the pulsations are very large—cannot be taken without also registering the impact of the

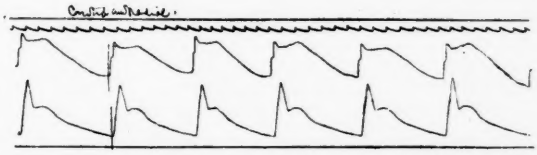

FIG. IV. The movement of the carotid artery registered simultaneously with the radial pulse.

carotid beat; the artery lies alongside the vein in the neck, and the shock of the carotid pulse makes a wave in the venous tracing. This "carotid wave" is usually easily recognised, and really serves as a useful landmark, its time of occurrence being practically synchronous with the radial pulse. The easiest way to follow the changes that take place in a venous pulse as the right heart dilates, is to find a case where, at first, the tracing taken from the neck is entirely due to the carotid pulsation. Then one can observe the gradual development of the venous pulse from the slightest (auricular) to the most advanced (ventricular) type. Thus Fig. 4 shows a tracing from the radial artery taken simultaneously with a pulsation in the neck which is entirely due to the carotid. Both movements, being dependent upon the contraction of the left ventricle, are synchronous. The heart now commences to dilate, and the next tracing, Fig. 5, taken from the same situation in the neck, shows another wave *a*, which, as it precedes the upstroke of the radial pulse, can only be due to the systole of the right auricle. This is the "auricular wave" of the venous pulse. In the tracing the wave, *a*, is very small, and the

carotid beat which follows is almost unchanged, for this is the very earliest manifestation of a venous pulse. As the heart dilates still further the pulsation in the neck, which in the last tracing is mainly due to the carotid, becomes more and more dependent upon the venous waves. Then the carotid beat is obscured, but the position of its wave in the next tracing, Fig. 6, can still be fixed by timing its occurrence with the radial pulse. The wave *a* has now increased in size, and there is a new wave *v*. Mackenzie has shown that this rise *v*, is synchronous with and is due to the systole of the right ventricle, and he calls it the "ventricular wave."

The venous pulse during normal pregnancy is always of this form—the "auricular type."

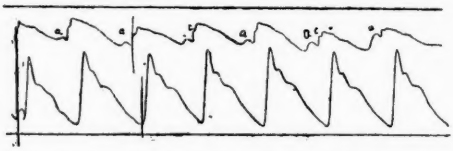

FIG. V. To show the earliest manifestation of Venous pulse—the wave *a* (due to the auricular systole) preceding the carotid beat. Radial pulse tracing taken simultaneously.

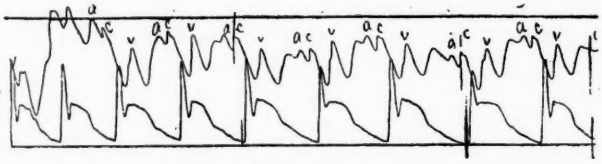

FIG. VI. Jugular pulse of the auricular type; *a*, auricular wave; *c*, impact of carotid pulse; *v*, ventricular wave of venous pulse. Radial tracing taken simultaneously.

There is one point in connection with the "ventricular wave" which needs explanation, and it is this: why does the wave, if due to the systole of the right ventricle, not occur simultaneously with the carotid pulse-wave which is due to the left ventricle? The ventricular wave in the tracing (Fig. 6) is long in appearing—considerably later than the carotid pulse-wave. The reason is that the first part of this wave is absorbed by the dilating auricle, which lies between the contracting ventricle and the vein; it is not till the auricle is filled that the pulse appears in the vein. When this explanation is appreciated, it is easy to understand how a venous pulse of the auricular type becomes converted into the ventricular form, for if the tricuspid valves are largely incompetent, the auricle will be filled very early, and the ventricular wave will appear much

sooner, as in Fig. 7. In such cases the auricle is so much distended that it can hardly contract at all; hence the very small wave *a*, preceding the almost immediate rise of the large ventricular wave *v*.

The "ventricular type" of venous pulse is only found in cases of pregnancy which are complicated with valvular disease; the extreme dilatation of the heart necessary for its production is almost always secondary to disease of the mitral valves.

From the condition shown in Fig. 7, matters proceed until the

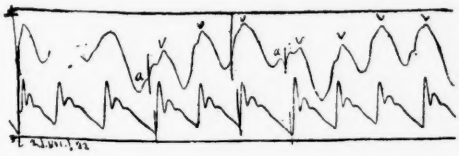

FIG. VII. To show the enlargement of the ventricular wave of the Venous pulse *v*, as the auricle becomes over-distended, and nearly ceases to contract. The auricular wave, *a*, is very small and immediately precedes *v*.

auricle becomes so over-distended that it ceases to contract at all; it has become paralysed from over-distension. Then the final change in the venous pulse takes place, and there is now no wave due to the auricular systole preceding the ventricular systole, but only a single large wave synchronous with, and due to the systole of the right ventricle (Fig. 8).

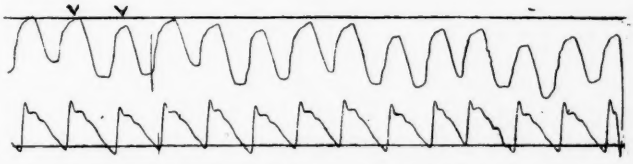

FIG. VIII. Fully developed Ventricular Venous pulse—the single wave *v*, is synchronous with and due to the right ventricle. The auricular wave *a*, is absent. Auricular paralysis.

Paralysis of the Auricle. It is clear that if the auricle contracted it would certainly affect the column of blood in the jugular vein as in the tracing (Fig. 6), but if the auricle remained a passive bag, a wave due to the ventricular systole would be synchronous with the arterial pulse as is seen in Fig. 8. From the disappearance of all signs in the veins of an auricular contraction, and from the fact that a presystolic murmur disappears at the same time, Mackenzie has assumed that the right auricle is paralysed.

Thus with progressive dilatation of the right side of the heart due

to mitral disease, the ventricular wave in the venous pulse steadily enlarges as the auricular wave diminishes. The ventricular wave, following more and more quickly upon the auricular, comes at last to be the only wave thrown back into the vein—the auricle and ventricle having then become practically a single chamber. Mackenzie has also demonstrated almost to complete proof, that when the right auricle is paralysed the left auricle also ceases to act; hence a presystolic murmur is never present with a ventricular venous pulse. No presystolic murmur means that the auricle is incapable of contracting, and the long diastolic murmur, which is present under such circumstances, is evidently due to the onrush of blood from the dilated paralysed auricle through the narrowed mitral orifice during the ventricular diastole.

When dilatation of the heart has advanced to this stage, as happens not infrequently in women with valvular disease who have undergone the strain of several pregnancies, a very serious state of matters exists. The condition, however, is not necessarily fatal, and patients may live many years, during which time the auricles may even be restored to temporary activity.

In regard to the question of pregnancy occurring in women who suffer from valvular disease, Mackenzie has shown that the information derived from a study of the various phenomena arising out of the dilatation of the right side of the heart affords some sure ground on which the practitioner may base his treatment. He concludes his most instructive paper with the following rules:—

1. When there is distinct evidence of failure of compensation, as evidenced by dropsy, enlarged liver, etc., or when the patient is liable to frequent attacks of failure of compensation, pregnancy should be forbidden.

2. With fair compensation, if there should be paralysis of the auricle, as evidenced by the presence of a diastolic murmur and the absence of a presystolic murmur, or of a continued irregularity of the pulse, or of a jugular pulse of the ventricular type, pregnancy should be forbidden.

3. With fair compensation, with a mitral murmur systolic or presystolic in time, with the apex beat within the nipple line, and due to the left ventricle, the patient may undertake the burden of pregnancy.

In all cases of valvular disease, when conception has occurred, the patient should be kept under close observation. One feature of great prognostic significance is the presence or absence of symptoms of œdema of the lungs.

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REVIEW OF CURRENT LITERATURE.

OBSTETRICS.

The Use of Spinal Anæsthesia in Labour.

Martin. *Münch. med. Wchnschr.*, October 16th, 1904,

In this paper Martin records his impressions of the value of Bier's method of lumbar anæsthesia from its use in over thirty cases of labour. A combination of adrenalin and cocaine was employed for the injection. One cubic centimetre of a solution of adrenalin (1 in 2,000) was injected into the spinal canal, under Schleich's local anæsthesia, and, five minutes later, this was followed by an injection of cocaine in a dose varying from 0·8 of a gramme to 2 grammes. Among the thirty cases, of whom half were primiparæ, all healthy women whose ages ranged from 18 to 36 years, complete anæsthesia was obtained extending commonly up to the lower ribs, and occasionally so widespread as to render the whole trunk analgesic. In one case only was the anæsthesia confined to the genital organs alone. The time of duration of the anæsthesia was sometimes not much more than half an hour, but at other times lasted as long as four hours. Martin finds that pregnant women bear spinal anæsthesia very well, and disagreeable after-effects are not usual. Occasionally very severe vomiting occurred, but rigors with rise of temperature did not appear in any of the cases. The untoward symptoms did not seem to be controlled in any way by the use of subcutaneous injections of caffeine-sodium-salicylate as recommended by Tuffier.

As regards the effects of this form of anæsthesia on the course of labour, it was noted that the activity of the uterus was somewhat impaired, both in the number and force of the contractions. The "bearing-down" pains were specially affected, for the abdominal muscles were only called into play when the patient was urged to do so. If the labour was completed within one and a half hours after the injection, the women had hardly an unpleasant sensation in the whole process of delivery, even when this entailed the use of forceps, turning, etc. Spinal anæsthesia in no case led to the occurrence of anxious symptoms during the third stage of labour, and the processes of uterine involution and of lactation were in no way disturbed.

Martin considers that while this method of anæsthesia should not displace chloroform in private practice, it will, when further tested experimentally, become more apparent that it produces no harmful results. He now intends to test its value in some cases of pathological labour.

OLIPHANT NICHOLSON.

Injection of Stovaine into the Spinal Cord in Obstetrics.

CHARTIER. *La Gynécologie*, October, 1904.

ACCORDING to Chaput and others stovaine has certain advantages over cocaine for intraspinal injection. The former dilates the vessels, slows the pulse, does not tend to cause syncope, and allows of operations being performed while the patient is sitting up. It is less toxic than cocaine and can therefore be employed in larger doses, the only adverse sequelæ being occasional slight headache and backache with a very slight rise of temperature.

Chartier gives details of 11 cases in which he has used stovaine himself, employing a 10 per cent. solution made up with sodium chloride. He injected 5 to 8 drops, *i.e.*, 2½ to 4 centigrammes of stovaine.

Sensory phenomena. After injection of 2½ cg. anæsthesia begins in the toes and spreads up until it reaches a variable limit between the umbilicus and the inter-mammary line. Complete anæsthesia lasts from three-quarters of an hour to one hour. At the end of this time vaginal and perineal tears can be sewn up painlessly. There is complete loss of uterine sensibility, the patient being unconscious of the most violent uterine contraction six or eight minutes after the injection. Seven applications of forceps, one curetting and one basiotripsy were carried out without causing any pain.

Motor Phenomena. Complete paraplegia is obtained in a few minutes, the abdominal muscles are relaxed, and the soft parts of the birth-canal lose their tonicity. As there is no expulsive action of the abdominal muscles and the soft parts stretch readily, the accoucheur can avoid rupture of the perineum in cases where otherwise this accident would be very likely to occur.

Stovaine, like cocaine, acts as an oxytocic. The maximum frequency and force of the uterine contractions occur in fifteen to twenty minutes after the injection. At the end of forty-five or fifty minutes after the injection of 2½ c.gr. of stovaine the contractions

begin to diminish in strength, and at the end of an hour they are once more painful. The cervix is easily dilated. In two cases where uterine inertia threatened an undue prolongation of labour this oxytocic action was most useful. In five cases the placenta came away while the patient was still under the influence of the drug. There is no danger of tonic contraction if the dose is not larger than 2—5 cg., and this dose may if necessary, be repeated. Injection of stovaine for surgical purposes is, of course, contraindicated in pregnant women.

General phenomena. There is no evidence that the fœtus suffers from the toxic effects of the drug. As regards the mother no bad effects were seen immediately; later however, six out of the eleven patients suffered from more or less violent headache, chiefly frontal, with pains in the eyes and spine, giddiness, nausea and vomiting. These phenomena, which were never alarming, persisted until the eleventh day in two patients. Quinine was found to be the most useful drug in the treatment of these symptoms.

In the first case which Chartier records, a II-para, 7 months pregnant, not in labour, was given 3 cg. on account of uncontrollable vomiting. A uterine contraction lasting two minutes began five minutes after the injection. Eight hours later the fœtus was born without assistance.

HENRY RUSSELL ANDREWS.

Intra-pelvic Hæmatoma following Labour not associated with Lesions of the Uterus.

WILLIAMS (J. WHITRIDGE). *Amer. Journ. of Obstet.*, Oct., 1904 .

BY the term puerperal hæmatoma we understand the effusion of a greater or less quantity of blood into the connective tissue spaces of some portion of the genital tract or into the structures immediately adjacent to it, in contra-distinction to hæmatocele formation in which the blood is poured out into the peritoneal cavity and then becomes encapsuled. Hæmatomata are classified as vulval, perineal, vaginal and subperitoneal or broad ligament, according to their point of origin. Of these varieties the last is the rarest.

On November 2nd, 1903, the author was called to see a primipara aged 28, who after an uneventful pregnancy had been delivered of a small child by the low forceps operation. Immediately after the

expulsion of the placenta the patient complained of intense tearing pain in the neighbourhood of the rectum. Within the next three or four hours the pain became more severe and extended into the lower abdomen, and the patient became profoundly anæmic. On examination there was no escape of blood from the vagina and only a slight perineal tear. The uterus was firmly contracted and its fundus felt at the level of the umbilicus, and beneath it filling out the entire lower abdomen, was a firm, rounded, slightly fluctuating tumour, somewhat sensitive on pressure, extending from within three finger's breadth below the umbilicus to the symphysis pubis. At first glance it appeared to be the distended bladder, but upon catheterization only a few c.c. of blood-stained urine escaped. Per vaginam the cervix was felt just above the level of the promontory of the sacrum and apparently not torn. The entire left posterior quarter of the pelvic cavity was filled out by a firm tumour which extended from the cervix to the pelvic wall, and displaced the lateral and posterior vaginal fornices downwards. On percussing the lower part of the abdomen a distinct wave of fluctuation was transmitted to the vaginal fingers.

The diagnosis of incomplete rupture of the uterus with hæmorrhage between the folds of the broad ligament was made, and as the patient's condition was growing worse it was decided to open the abdomen. An incision was made from the symphysis to the umbilicus. After cutting through the fascia in the middle line a dark blood-stained tissue came into view which broke down readily under the fingers but did not come in contact with the peritoneum except for a distance of 5 cm. just below the umbilicus. At this spot the peritoneal cavity was opened and the incision enlarged upwards. The uterus was seized and drawn up into the wound, it was found perfectly intact as likewise were the tubes and ovaries. Lying in front of the uterus was the contracted bladder whose peritoneal covering presented an ecchymotic appearance. On careful examination with the hand in the abdominal cavity it was found that the tumour lay beneath the peritoneum and in front of and below the uterus and bladder. The peritoneal incision was closed by a continuous suture, and after a blunt dissection in the sub-peritoneal tissues the finger entered a large cavity filled with fluid and clotted blood. This cavity extended from three finger's breadth below the umbilicus to the pelvic floor; anteriorly it was bounded by the symphysis pubis and anterior abdominal wall, posteriorly by the displaced bladder and posterior fold of the left broad ligament, inferiorly it reached the pelvic floor whilst laterally it had spread apart the folds of the left broad liga-

ment and displaced the uterus to the right. After sponging out the cavity the walls presented a jagged blood-stained appearance, and upon the anterior and inferior aspect of the bladder was an oozing surface. The hæmorrhage was arrested by tightly packing with iodoform gauze, the end of which was brought out at the lower angle of the incision, and the vagina firmly packed to make counter pressure. The remainder of the abdominal wound was then closed by silver wire sutures. Recovery was gradual but uninterrupted. For the first few days there was considerable oozing from the wound, and when the packing was removed four days after the operation, a sound introduced through the external wound passed 15cm. before reaching the floor of the cavity. The wound closed rapidly so that at each subsequent dressing a smaller quantity of gauze was employed, and soon all that was left was a small sinus which eventually closed.

The author has collected from the literature 33 cases of sub-peritoneal hæmatoma following labour and not associated with rupture of the uterus. In many of these cases the hæmatoma attained immense proportions, the peritoneum being dissected up to such an extent that the blood came to lie in the iliac fossa and frequently extended up along the psoas muscle to the region of the kidneys and occasionally to the roots of the diaphragm.

In 80 per cent. of the cases the labour was spontaneous, in only one case did the weight of the child exceed 8 lbs., and 20 per cent. of the cases occurred in primiparæ. The mortality was 56 per cent., but was much greater in the older than in the more recent cases. In several cases death was due directly to the hæmorrhage, and in one case to secondary rupture of the hæmatoma into the peritoneal cavity.

HERBERT WILLIAMSON.

The Operative Treatment of Chronic Puerperal Inversion.

THOMPSON (H.). *Zentral. für Gynäkol.*, 1904. No. 49.

THE patient was aged 21 years, and a I-para. At her confinement the placenta was retained for three hours after the birth of the child. It was then allowed to come away of itself. This resulted in much hæmorrhage, and the pain was extreme. Nine days later on account of pain, fever, and hæmorrhage, medical aid was sought and a piece of placenta removed, after which the hæmorrhage ceased. It, however, returned two months later, and from February until May, 1904, there had been much discharge, pain, great weakness and constipa-

tion. Reposition had been attempted; it had caused great pain and rise of temperature. On admission a swelling the size of an orange was found in the vagina. This was continuous above with a narrow ridge 1cm. high. The position of the fundus was occupied by a depression. The investigation was painful, the tumour bled easily on contact. There was no perineal tear. After another further attempt had been made at reposition, an anæsthetic was given and Küstner's operation was carried out. A transverse incision 3cm. long was made in the posterior vaginal wall, and the left index finger was inserted into the funnel-shaped depression, but the inversion could not be dragged back. The posterior wall of the inverted uterus was now split for a distance of 3cm. The edge of this incision was seized with forceps and traction from within combined with pushing from without. Reposition was thus effected and the fundus was drawn out through the vaginal wound, and the posterior uterine wall sewn up by catgut. Some adhesions which were separated from the fundus were still oozing when the fundus was returned into the peritoneal cavity, consequently a drain of iodoform gauze was inserted in the pouch of Douglas. This was removed on the third day. The patient left hospital 21 days after the operation. The uterus was then normally anteflexed, movable, and completely involuted. Before the operation and for some days afterwards the temperature was 99·8, whilst the original pulse frequency of 100 beats per minute gradually improved. CUTHBERT LOCKYER.

On the Serum Treatment of Puerperal Fever.

PEHAM. *Archiv für Gynäkol.*, 1904. Bd. lxxiv., Ht. 1.

PEHAM records and analyses 44 cases of puerperal fever treated with Paltauf's serum in Vienna. He considers these experiments to prove that puerperal infections caused by streptococci are influenced by the administration of this serum, however severe the infection may be. The experiments also show that the influence of the serum depends upon its administration at the earliest possible moment and upon the use of relatively large doses. In disease of long duration and in the presence of serious organic lesions the serum is powerless; it would seem also that it is unable to prevent the advance of localised suppurative processes such as metastatic abscesses. The serum does not produce any bad effects even in those cases in which the disease is due to infection by organisms other than streptococci.

W. E. FOTHERGILL.

Thrombosis and Embolism during the Puerperium.

RICHTER. *Archiv für Gynäkol.*, 1904. Bd. lxxiv., Ht. 1.

THIS paper deals with 98 cases of thrombosis and embolism occurring in 16,000 puerperal women. There were twelve fatal cases of embolism which, in five cases, followed thrombosis. Eight embolic cases recovered, there being in all twenty cases of embolism. Six per thousand of the women suffered from thrombosis and embolism; 1·25 per thousand from embolism alone. Of the embolic cases 60 per cent. were fatal. Of the serious cases of thrombosis only one was directly fatal. In this case a thrombus of the pelvic veins extended into the inferior vena cava and so into the right heart. Forty cases observed by the writer in Leopold's Dresden clinic are recorded in detail. In 63 per cent. of the cases Mahler's sign was clearly present; in 34 per cent. it was less marked. In only 2 per cent. was it altogether absent.

In 19 cases of pulmonary affection (18 puerperal and one after ovariotomy) Mahler's sign was clearly present 8 times (42 per cent.), in 10 cases it was less marked. The value of Mahler's sign in puerperal embolism and thrombosis (including "puerperal lung affections") is thus very great, the more so because it is the only early symptom of these conditions. Rigid prophylactic measures are therefore called for as soon as the sign is found, in the hope of warding off embolism.

W. E. FOTHERGILL.

The Diagnosis of Rupture of the Circular Sinus during Labour.

MAYGRIER (CH.). *L'Obstétrique*, November, 1904.

IN 1893 Budin drew the attention of the profession in France to the observations of M. Duncan on this condition, and since then the author has been struck by the large number of cases which come to his notice. The condition is easily recognised after labour by the presence of a clot, near the margin of the placenta, protruding from the open sinus; but it must be confessed that the lesion had caused no symptoms and had not been suspected during labour. But cases occur in which the hæmorrhage during pregnancy or labour may be considerable. It is not easy to diagnose the causation of such hæmorrhage, which may arise from the separation of a placenta normally or abnormally situated. Any symptom accordingly which

may throw light on the diagnosis should be of interest, and the author has been surprised to find how constant is the symptom he describes, and it is this: at the beginning of the second stage of labour there is a slight hæmorrhage at the onset of a pain; the hæmorrhage ceases during the continuance of the pain only to recur so soon as the uterine contraction has passed off. These phenomena are due to pressure during a pain of the fœtal head on the bleeding point. The quantity of blood lost is sometimes so large as to require the termination of the labour by the application of the forceps. It seems probable that if the fœtus were not engaged the hæmorrhage would continue throughout each pain.

E. H. L. Oliphant.

The Natural Nourishment of Infants.

Spiegelberg. *Albany Medical Annals*, December, 1904.

The great importance of breast feeding in comparison with any substitute is first insisted upon. Nothing can take its place, and it should not be withheld from the child, even if the breast can only be used to supplement artificial feeding. The circumstances which prevent a woman from nursing are carefully considered. Tuberculosis is regarded as an absolute contra-indication. The danger lies not in the passage of toxins or bacteria through the milk, but in the intimate association between the mother and the child. Fevers in general, it is stated, form no contra-indications to nursing unless associated with marked prostration or collapse. The fever itself exerts no deleterious influence on the milk, and immunisation of the child is effected through the milk in a number of these cases. Mastitis and depressed nipples are the two most important external contra-indications to nursing. The "no milk" or "not enough milk" reason given for not nursing the author evidently regards with much scepticism. He quotes with approval Budin's dictum "la quantité du lait varie avec la demande," and states that at Münich the wet nurses are able to nurse two or three infants and yet can withdraw milk by massage for the sick infants. Whether the breast can secrete enough milk cannot be judged before the tenth to fourteenth day. A complete removal with avoidance of retention is the golden rule of lactation, and with this precaution nearly every mother can be safely carried through the puerperal period perfectly able to nurse her baby. During the entire period of lactation the same rule should

be observed. Nevertheless no physician would deny that some women are incapable of producing a requisite amount of milk. Such women should never omit to nurse their babies as much as they are able, and the deficiency should be replaced by artificial feeding. Once regular nursing is established the intervals should be three hours. Only premature or otherwise weakly children should be nursed more frequently. The night feedings should not be oftener than six or eight hours. A nursing woman should be allowed to eat whatever she wants provided it does not disturb her digestion. Monotonous overfilling is unnecessary, and results only in spoiling the mother's appetite and thereby impairing her health and efficiency. Lactagogues are superfluous, and many have not even the advantage of being harmless. The best lactagogues are good hygiene and moderate exercise.

As regards the nourishment of sick infants, the author points out first, that the lives of many weak, atrophic, premature, syphilitic, infants can be saved by breast milk; and second, that in severe gastro-intestinal disturbances of breast babies it is seldom necessary to stop nursing or to change the diet except to reduce the quantity. In many cases of gastro-intestinal disease in artificially fed infants the best medicine is breast milk.

R. Hamilton Bell.

A Case of Bloody Milk.

Bouchacourt et Jeannin. *Bulletin de la Soc. d'Obstét. de Paris*, No. 5. Meeting of June 16, 1904.

The authors have been unable to find any record of a similar case to the one which they report. A primipara æt. 20, was noticed to have a chocolate-coloured secretion from both breasts at the time of labour. The patient stated that this had continued for 10 days. On the third day after labour the secretion was examined and was found to contain blood and a large number of micro-organisms of various sorts, including the staphylococcus aureus and the colon bacillus. On the 5th day the milk—which was abundant—possessed the same characters. The patient was perfectly well until the 7th day, when there was pain and swelling of the breasts with some fever; it was possible to express some pus from the nipples. This was the onset of an attack of double galactophoritis. The cause of the intra-mammary hæmorrhage was not discovered.

G. Drummond Robinson.

GYNÆCOLOGY.

Intra-peritoneal Hæmorrhage due to the Rupture of a Hæmorrhagic Cyst of the Ovary.

BENDER AND MARCEL. *Bulletin et Mém. de la Soc. Anat. de Paris*, July, 1904.

AT the present time the tendency is to consider all hæmorrhagic effusions into the female pelvis as a consequence of an ectopic gestation. The authors record the present case as an example of an internal hæmorrhage, serious enough to endanger the patient's life, caused by the rupture of a hæmorrhagic cyst of the ovary.

The patient was a woman of 26, who was admitted to the hospital as an urgent case, with all the signs of a severe internal hæmorrhage. She gave a history of delayed menstruation followed by irregular metrorrhagia, with an acute onset of the present symptoms 36 hours before. She showed extreme pallor, the pulse was 150 and scarcely perceptible at the wrist, and there was great abdominal pain and tenderness, so that the case was naturally considered as one of ruptured tubal gestation, and as sufficiently urgent to require immediate abdominal section. About a litre and a half of blood was found in the peritoneal cavity, and a large clot was removed from behind the left broad ligament together with the appendages of that side. The right appendages were normal. Examination of the parts removed revealed little change in the tube; some of the fimbriæ were adherent to the ovary, but the ostium was patent, the canal was free from blood and the mucosa was perfectly healthy. On searching for the cause of the hæmorrhage, a small thin-walled hæmorrhagic cyst was found in the ovary, which presented a considerable rupture, from which protruded a mass of clot adherent to the inner wall.

Histological examination failed to show any evidence of gestation products, and confirmed the naked-eye appearances by revealing a layer of epithelium with cells like those of the granulosa lining the inner wall of the cyst. In view of the careful examination made during the operation and of the parts removed, the authors consider that this ruptured cyst must have the cause of the extensive hæmorrhage into the peritoneal cavity.

J. S. FAIRBAIRN.

The Origin of Intra-muscular Branchings of the Tube-lumen.

HOEHNE. *Archiv für Gynäkol.*, 1904. Bd. lxxiv., Ht. 1.

THIS is a contribution to our knowledge of the origin of ectopic gestation based on the now well-known fact that a tubal gestation sac often occupies a space within the wall of the tube and not in its lumen. The author's object was to discover the nature and origin of intramuscular offshoots of the tube lumen. His method was that of injection. Tubes removed in operation or autopsy were placed in water at 40°C., and an injection mass was then forced into the tube from the abdominal opening towards the uterine end. The injected tubes were then placed in 10 per cnt. formalin solution, and after hardening were examined by serial transverse sections. The number of tubes thus examined was 136.

In 1886 Martin described canals lined with epithelium in the tube wall as "salpingitis follicularis," and in 1889 Werth pointed out the importance of these as regards tubal gestation. Subsequent writers confirmed these observations and regarded the intramuscular branchings as the result of inflammatory processes. Some pathologists, however, preferred to regard these canals lined with epithelium as mesonephoric relics, and considered them to be the origin of various adeno-myomata. The present author reviews the discussion on this point and finds the literature to show that in a great majority of cases the canalisation of the tube wall with tracks lined with epithelium is the result of inflammatory processes. The production of adenomata, cyst-adenomata and adeno-myomata of the tube wall is possible owing to the presence of Müllerian or Wolffian relics, but is a rare occurrence. The writer's own observations show that the holes in the tube wall are formed as a rule by the evacuation of little abscesses into the lumen of the tube. In gonorrhœal and other inflammations in fact, there is pus-tracking within the wall of the tube. After the evacuation of the products of suppuration, and as a part of the healing process, the epithelium of the tube grows into and lines the cavities and tracks in the tube wall, turning these into canals lined with epithelium and communicating with the lumen by various openings or perforations differing in shape, size and direction. A number of preparations illustrating this process are carefully described and figured.

W. E. FOTHERGILL.

Three Unusual Myomata.

KÜSTNER. *Zentral. für Gynäkol.*, 1904. No. 49.

KÜSTNER publishes a short account of three myomata. One was removed from the sigmoid flexure; a second from the cervical stump after supravaginal amputation; the third from a gravid uterus.

1. *Myoma removed from the sigmoid flexure.* The patient, a II-para, was aged 53 years; her last pregnancy was 24 years ago. Since the climacteric, that is to say, for three years, there had been indefinite pain in the pelvis. On examination a myoma was diagnosed behind a markedly anteflexed uterus. By laparotomy it was discovered that the tumour grew from the mesial aspect of the meso-sigmoid. It was removed, and the patient recovered. Microscopically the diagnosis of fibromyoma was confirmed. Küstner remarks that fibroids in this situation *(darmmyome)* are very rare.

2. *Myoma in cervical stump.* The patient was aged 42 years. She had one child twenty years ago. The uterus was removed together with the adnexa in 1900 on account of double pyosalpinx. On November 24th, 1903, a myoma the size of an apple was found to be growing from the cervical canal. It was removed and the actual cautery applied to the site of enucleation. The development of a growth in a segment of the cervix left behind after supravaginal hysterectomy raises the interesting question as to whether the operation of panhysterectomy is not preferable to the supravaginal method. Küstner himself in this observation sees no argument in favour of panhysterectomy. He says, if a myoma does develop subsequent to supravaginal hysterectomy its removal from the cervix is a matter of the greatest simplicity.

3. *Myoma in a gravid uterus.* A uterus was shown from the posterior wall of which an interstitial myoma had been enucleated. The patient was aged 40 years. She had a generally contracted pelvis. The operation was undertaken during the 29th week of pregnancy. The fœtus was first removed by Cæsarean section and placed in an incubator. It died in a few hours. Küstner performed the operation at the urgent desire of the patient, who showed signs of peritonitis and failing health. Her condition became so serious that he decided not to postpone the operation until such time as would assure a more secure viability of the fœtus.

The tumour was adherent to the pouch of Douglas; it was in part

soft and lymphangiectatic. Küstner was aware that not a few myomectomies had been performed during gestation without disturbance to the latter. He, however, did not approve of this interference unless it was called for by some unusual circumstance.

CUTHBERT LOCKYER.

Pedunculated Uterine Fibroid with Torsion of its Pedicle and of the Uterus.

FERRY. *Bull. et Mém. de la Soc. Anat. de Paris*, May, 1904.

THE patient was a woman of 49, who had known of the existence of an abdominal tumour for about 7 years; on several occasions she had suffered from attacks of abdominal pain with constipation and dysuria, two occurring a few months before her admission to hospital, the last being the reason of her admission.

At the operation the pedicle, which was about the thickness of 3 fingers, was found to arise from the fundus of the uterus and to be twisted on itself for a turn and a half in the direction of the hands of a watch; the uterus was involved in such a way that it had taken a half turn so that the left appendages were to the right and the right to the left. There were signs of peritoneal reaction as shown by redness of the serosa, fine adhesions and the presence of a serous exudate in the abdomen. The pedicle was tied off, the tumour removed and the uterus replaced. The tumour weighed 3·3 kilos.

J. S FAIRBAIRN.

Cancer of the Breast with Secondary Invasion of a Uterine Fibroid.

BENDER and LARDENNOIS. *Bullet. et Mém. de la Soc. Anat. de Paris*, October, 1904.

This communication gives a careful account of a *post-mortem* examination on a case of general diffusion of carcinoma, at which a fibro-myoma of the uterus was found to have undergone extensive epitheliomatous transformation, without there being any change in the uterine mucosa.

The patient was a woman of 36, who had been operated on a year previously for cancer of the breast; on this occasion she was admitted to Hospital for uterine hæmorrhage. The uterus was found to be

enlarged to the size of a fœtal head by an irregular bossy mass, quite movable and presenting all the characteristics of a fibro-myoma. As there was no evidence of recurrence and as the general condition was good, it was decided to do abdominal hysterectomy, but before this could be carried out signs of invasion of the spinal cord appeared and the patient rapidly became cachectic and died within a few months. At the autopsy very general diffusion of the growth was found, the lungs, liver, pancreas, bones, etc., being affected. The chief interest lies in the examination of the uterus. It formed a mass about the size of a fœtal head, and contained numbers of interstitial and sub-peritoneal fibroids, the largest being about the size of a large orange. On section some of these tumours, and especially the largest, were found to be studded with small nodules of new growth similar to those seen in the liver and other organs. The mode of invasion appeared to be from without inwards or from the surface of the myoma to its centre. Microscopic examination of these portions showed bands of epithelial cells splitting up the fibro-muscular bundles and invading the tissues of the tumour just as in the sections from other organs involved by the growth. The uterine mucosa was healthy.

J. S Fairbairn.

Primary and Secondary Repair of Perineal Tears Involving the Sphincter Ani.

Planchu. *L'Obstétrique*, November, 1904.

The author finds that the standard French text-books of midwifery fail to describe the technique of operative procedures for restoration of the perineum after labour, though all insist on the importance of an immediate suture of the parts torn. Planchu, with the aid of illustrations, describes the lesions in detail, drawing attention especially to the lacerations in the upper part of the vagina, running up on one or both sides of the posterior column which is undermined at the lower end. The laceration of the sphincter ani is usually rather to one or other side of the median line and the tear of the rectum runs upwards in a straight line and is easily seen from the pink colour of the rectal mucosa forming a contrast with the dark tissues of the torn perineal body. The remains of the sphincter form not more than a half circle.

The essential point in the steps of the operation for the repair of this laceration is to secure accurate union of the wound in the rectum

with restoration of the function of the sphincter. The exposed part of the rectum is to be well guarded with a pad and the upper part of the vagina must be plugged to keep the field of operation clear of blood from the uterus. The upper end of the wound is then easily exposed as the rectal mucosa is never torn to quite so high a level as the vagina. Stitching with fine catgut and a small curved needle should be begun somewhat higher than the top of the rectal wound, and a series of interrupted sutures is taken down to the anus not more than a quarter of an inch apart. These stitches are taken through the mucous membrane. The sphincter is next secured, the first stitch being backed by a deeper one of silk. When this has been accomplished there is left the repair of a simple perineal tear. The perineal body is brought together by buried sutures of silk covered in by a superficial layer of catgut. The vagina is kept clean with frequent douches and the bowels are to be moved from the second day.

Should there be any contra-indications for immediate operation, such as thrombosis, œdema, or the general condition of the patient, or if the primary operation should fail, repair should be attempted early. The author has operated on the 12th day with success. He gives a number of illustrative cases.

E. H. L. Oliphant.

The Origin and Import of Leucocytosis.

Birnbaum. *Archiv für Gynäkol.*, 1904. Bd. lxxiv., Ht. 1.

This writer, after an examination of the literature of the subject and a record of his personal observations, forms the opinion that the view expressed by Grawitz in 1896 was substantially correct. "I am able to affirm," said this authority, "on the ground of very numerous observations, that in all possible forms of septic disease leucocytosis is present in the majority of cases. On the other hand, there are, not infrequently, very active inflammations without any leucocytosis. I emphasise this because many are attaching undue importance to the presence of leucocytosis in diagnosis; for while undoubted neutrophil leucocytosis, when present, is of definite diagnostic importance, the absence of leucocytosis is a negative finding which by no means excludes the possibility of the presence of pus."

W. E. Fothergill.

REPORTS OF SOCIETIES.

OBSTETRICAL SOCIETY OF LONDON.

Meeting, December 7th, 1904, Sir William Sinclair, M.D., *Vice-President, in the Chair.*

Lieut.-Col. A. G. Sturmer, I.M.S., forwarded a short communication on a case of Abdominal Gestation, which had been under his care in the Madras Government Maternity Hospital, and the parts removed were shown. When the patient first came under observation the periods had ceased for five or six months. There was no sign of fœtal life, and the abdominal swelling seemed to decrease in size during the four weeks she was under observation. At the operation a female fœtus, weighing 2 lbs. 6 ozs. was removed. Part of the placenta was separated without much difficulty from omentum and intestines, but in attempting to separate the lower attachments free bleeding was caused. It was found that the fundus of the uterus had come away with the placenta, and as the bleeding could not be otherwise controlled, supra-vaginal hysterectomy was performed, both appendages being removed at the same time. The tubes appeared to be macroscopically intact, and there was no history of any such occurrence as a rupture, but pending further investigation, no opinion was offered as to whether the condition was primary or secondary.

Dr. Cullingworth and Dr. Amand Routh referred to cases which showed that the Fallopian tube may, by virtue of the remarkable properties of unstriped muscle, resume its normal dimensions and appearance very quickly after the escape of an ovum from within it.

On the motion of Dr. Cullingworth, the specimen was referred to the Pathological Committee.

Dr. Walter Tate contributed a paper on

Three Cases of Intestinal Obstruction Following Operations for Fibroid Tumour of Uterus, with Special Reference to the Choice of Operation.*

* *Vide* p. 30.

Mr. Alban Doran considered that the flaps of the uterine stump should be closed by a continuous suture, to avoid increase of the number of knots, which at the best was the most unfavourable feature in supra-vaginal hysterectomy. An enema as well as purgatives should be given on the second day. In his own practice one case of obstruction, which he related, had occurred in 98 supra-vaginal hysterectomies. In respect to the danger of obstruction, the Abel-Zweifel theory that a portion of the uterus above the os internum should be saved as well as the ovaries was of importance. Abel seemed correct in demonstrating that this practice greatly lessened the risk of psychical disturbance, but it involved a big stump, which probably increased the chances of intestinal obstruction. This uncertainty as to remote physiological effects was an objection to

pan-hysterectomy; besides, the sutured flaps of peritoneum deep in the pelvis might cause obstruction. Von Winckel recently related a case where a large vaginal hernia developed, so that the patient complained that she often sat on her bowels, an eminent instance of a bad intestinal complication.

Dr. PETER HORROCKS considered that pan-hysterectomy for fibroids was more difficult to perform, was followed by greater shock, had a higher mortality and left the pelvic floor in a weaker state than supra-vaginal hysterectomy. He thought that of the three cases reported by Dr. Tate two should be left out of consideration, on the ground that one being a case of myomectomy and the other being associated with sub-involution after delivery, adhesions were specially likely to occur and obstruction to ensue. One case of obstruction in 150 supra-vaginal operations was about the average, and that was his own experience. He considered that a continuous suture was better than an interrupted one for the peritoneum covering the stump; in his own practice he used fine silk.

Dr. GALABIN did not consider Dr. Tate's contention proved by the evidence adduced. He thought that the method of doing the operation might make a difference. He made no flaps, but cut across at the narrowest point, about the level of the internal os. But if fibroids involved the cervix so that he could not get below them, he always chose pan-hysterectomy. He adopted rather an elaborate suture, but thought that it was worth the increased time occupied, as he had never had a case of intestinal obstruction after either supra-vaginal hysterectomy, pan-hysterectomy or vaginal hysterectomy. He first closed the broad ligaments by uniting their anterior and posterior faces with sutures at the site of the round ligaments and the uterine arteries. He then united the peritoneum in a transverse line, getting a sero-fibrous union by piercing the anterior peritoneum twice, and using a continuous suture of fine silk. The stump was dealt with by stitching the edge of peritoneum left above the bladder in stripping it down, and thus was mainly covered by bladder and could come in contact with intestines only at its posterior edge. In pan-hysterectomy he united the peritoneum in precisely the same way. Similarly, in vaginal hysterectomy he preferred to stitch the peritoneum so as to fix the pedicles of the broad ligament in the vagina. In two cases in which he had had occasion to re-open the abdomen within two or three years after supra-vaginal hysterectomy, the line of suture was observed to be free and smooth, and no trace of the silk was discoverable.

Dr. HERBERT SPENCER said that he had relinquished the operation of supra-vaginal hysterectomy in favour of total hysterectomy for over five years. He had called attention two and a half years ago to the subject of intestinal obstruction after supra-vaginal operations, and had published a case of his own. On several occasions during the last ten years he had referred to the risk of septic peritonitis from infection of the cervical stitches long after the operation. Moreover, not uncommonly, cases were met with in which pus was discharged *per vaginam* after the operation. Hæmorrhage from, and the development of malignant disease in, the stump were other possible disadvantages. The lists of picked cases published produced a false impression of the advantages of supra-vaginal hysterectomy. The cases required following up and the later results recording before a correct estimate could be reached. Prolapse after total

removal he regarded as a bogey and not morely likely to occur when done for fibroids than after a similar operation for cancer. Personally he had never seen a case. For uniting the peritoneum he preferred a purse-string suture. He adopted the practice of leaving salt solution in the abdomen—he thought that it tended to prevent the occurrence of adhesions.

Mrs. Boyd questioned whether Dr. Tate's second case should be regarded as a case of typical mechanical obstruction, and thought it rather a condition of peritonitis with secondary matting of bowel.

Dr. Cullingworth stated that he had performed Baer's operation very nearly 100 times, and had had four undoubted cases of genuine intestinal obstruction, but in no case was it noted that the intestine had become adherent to the line of suture on the uterine stump. In regard to the relative merits of supra-vaginal hysterectomy and so-called pan-hysterectomy, he had an open mind. He had had little, if any, personal experience of pan-hysterectomy, so had no means of comparing the one with the other in his own practice. But as far as the mortality statistics put forth by C. P. Noble and by Olshausen showed, total extirpation was attended with a higher mortality, and most operators were agreed that total extirpation involved a longer operation. He could not subscribe to Dr. Tate's opinion that the simple transverse wound left after the operation at the bottom of the pelvis afforded little or no risk of dangerous intestinal adhesion, for he had known it to occur with fatal results in two cases after vaginal hysterectomy for cancer. He thought that Dr. Tate was relinquishing the supra-vaginal for total hysterectomy on very slender grounds, if his conversion really rested on the evidence brought forward in his paper.

Dr. Lewers had met with two cases only of intestinal obstruction after abdominal section. In both cases supra-vaginal hysterectomy had been performed. In one of these cases a coil of small intestine had become adherent to the scar over the stump across the floor of the pelvis. In the other obstruction was due to a coil of intestines slipping through a hole in the omentum. Dr. Lewers had never had any trouble after supra-vaginal hysterectomy due to suppuration in the neighbourhood of the stump. He had done a moderate number of pan-hysterectomies for fibroids, but the operation took longer, and, to his mind, presented no advantage over the supra-vaginal operation.

Dr. Tate replied.

Sir W. Sinclair showed a *Glass Vaginal Drainage Tube*, which he had devised, to obviate the difficulty usually arising from the omentum being drawn into and plugging the openings. It was furnished with a number of very small holes and was so shaped as to be self-retaining.

Dr. Lewers and Dr. Galabin were both satisfied with the results obtained by employing a strip of gauze in those rare cases where it becomes advisable to drain into the vagina by opening the pouch of Douglas.

BRITISH GYNÆCOLOGICAL SOCIETY.

Meeting held on December 8th, 1904, Professor J. W. TAYLOR, *President, in the Chair.*

Dr. H. MACNAUGHTON-JONES showed an *alveolar carcinoma of the Fallopian tube*, and alluded to the 53 cases recently tabulated by Mr. Alban Doran, most of which were papillomatous, the uterus being affected in 6 only; neither uterus nor ovary were involved in the present case.

The PRESIDENT showed two *Fallopian Tubes* removed at a third Cæsarean section after being ligatured twice in previous operations; also three specimens of cancer of the body of the uterus, the first a simple one, the second complicated by a large ovarian tumour apparently malignant, and the third a malignant adenoma invading a myomatous uterus. The inadequacy of ligature to prevent conception was, he said, now fully recognised; the better way was to remove the tubes with their insertions into the uterus by wedge-shaped incisions in the cornua. He also showed an enormous ovarian abscess which had extended up to the umbilicus and had been tapped by the vagina, three months previously, by another consultant. It was firmly adherent to the pouch of Douglas at the seat of the puncture. Vaginal drainage and a good recovery. The pus gave a pure culture of B. coli, but no adhesion or channel of communication with the bowel could be detected at the operation.

Dr. WILLIAM ALEXANDER read a paper on ADENOMA OF THE ENDOMETRIUM, illustrated by microscopical sections, photographs and lantern slides. He reported five cases in which the uterus was removed with good results to the patients, on account of recurrent hæmorrhage resisting all forms of treatment, including repeated curetting and, though not profuse enough to be absolutely fatal, leading to extreme anæmia and invalidism. The uterus was practically unchanged in size and shape and, except for some increase in glandular tissue, the curetting had no pathological features. The uterine cavity, however, in all cases presented a very definite and uniform appearance; the whole of the mucous membrane of the cavity and of the uterine ends of the Fallopian tubes being converted into a thick, semigelatinous, semifibrous membrane, running into folds or polypoid masses; it was described by Dr. F. Griffith, of the Thompson Yates laboratory, as adenoma of the endometrium.

Dr. MACNAUGHTON-JONES reminded the Society that he had himself exhibited two cases of glandular hyperplastic endometritis in which the adenomatous change described by Dr. Alexander had been present.

Dr. BOWREMAN JESSETT said that he had seen similar cases and was certain that the gelatinous alteration in the mucosa was a precancerous condition which, in time, would develop into malignant disease. It was seldom that hysterectomy was justifiable when the scrapings of the curette did not show malignancy, but he had known cases, pronounced to be benign on such evidence, afterwards prove to be malignant.

Dr. C. H. F. ROUTH condemned the removal of the uterus except for the proved presence of malignant disease; he had invariably been able to control metrorrhagia by the intra-uterine use of caustics or a red-hot iron.

Dr. HEYWOOD SMITH said it was only when such treatment failed that hysterectomy should be considered.

The PRESIDENT questioned whether a woman was in a much better condition after the introduction of a red-hot iron into her womb, than after hysterectomy. Mr. Lawson Tait, however, used the actual cautery extensively and with good results.

Dr. ALEXANDER, in reply, said that in his experience the disease was not malignant; in one patient after 18 years, there was apparently no more growth than at first, another, after 20 years' hæmorrhage, is still alive waiting for the menopause, and hardly worse than many years ago. Hysterectomy was not performed till other means had been fairly tried and had failed, and the removal of a uterus that was not only useless but a source of weakness need not nowadays be termed heroic! it was, in these cases, a simple and safe operation for a very grave disease. He always removed the uterus by the vagina and left the ovaries.

Dr. R. T. SMITH showed a *tubal sac containing a fœtus with its head towards the uterus*, which in its structural completeness was a remarkably interesting specimen of ectoptic gestation, the more so as the diagnosis had depended almost entirely on the physical signs, the patient, a Polish Jewess, knowing but little English.

Dr. BEDFORD FENWICK showed a *degenerated fibroid tumour* which was referred for a pathological report.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting held November 23rd, DR. E. K. KELLY, *President, in the Chair.*

The minutes of previous meeting were read and confirmed. Ten new Fellows were admitted to the Society.

FRESH SPECIMENS.

Dr. EDGAR showed a *blood cyst* removed from a patient who had been confined five weeks previous to operation. The blood was coagulated and covered with a fibrinous envelope which was adherent to Fallopian tube and intestines.

Dr. KELLY showed (1) *myoma of uterus with myxomatous degeneration;* (2) *multiple myomata of uterus;* (3) *parovarian cyst with torsion of pedicle;* (4) *tubo-ovarian cyst filled with pus—tubercular in origin.*

Dr. BALFOUR MARSHALL showed *eight polypi removed from a cervix uteri.*

Dr. RUSSELL read notes of a case of EPILEPTIFORM ATTACKS COMPLICATING DOUBLE OVARIAN TUMOUR, REMOVAL OF GROWTHS FOLLOWED BY CESSATION OF ATTACKS. The growths shown were seen to be large ovarian tumours partly cystic and partly solid; on microscopical examination carcinomatous tissue was found. The operation for removal was that of abdominal section. The after history of the case showed no return of the attacks nor of the pathological growth.

The paper was discussed by the PRESIDENT and Dr. S. CAMERON.

Dr. DUFF read a paper on a case of UTERUS DIDELPHYS WITH SEPTATE VAGINA. The patient complained of dysuria and profuse vaginal discharge, and thus came under notice. Menstruation had been normal.

The examination showed vaginitis and urethritis, probably gonorrhœal in origin. Later a slight thickening was found at the left side of the hymen; this contained an opening into a second vaginal canal. On careful preparation after the acute symptoms had subsided, the condition shown was two distinct vaginæ of equal length, two cervices, a distinct intervaginal septum complete from hymen to between the cervices. Fundus not felt. Patient some months later had a miscarriage, the pregnancy taking place in the right uterus. Later the passage of a sound showed two uteri completely separated. Dr. Duff traced the development of the generative canal with great interest. In conclusion he acknowledged his indebtedness for the case to Dr. Balfour Marshall.

The PRESIDENT, Drs. JARDINE and RUSSELL spoke.

Dr. BALFOUR MARSHALL read notes of a case of a PATIENT WHO HAD WORN A VULCANITE RING PESSARY FOR FIFTEEN YEARS. She was aged 60 and had passed the menopause 26 years ago. She was admitted to the Royal Infirmary complaining of dysuria and blood-stained vaginal discharge. The symptoms closely resembled malignant disease. On examination the pessary was found to have ulcerated the vaginal walls and to have become embedded, probably hastened by the atrophy of the parts. It was removed by cutting through the tissue which surrounded it.

The PRESIDENT, Drs. RUSSELL and JARDINE discussed the case.

EDINBURGH OBSTETRICAL SOCIETY.

Meeting, Wednesday, December 14th, 1904, Dr. BREWIS, *President, in the Chair.*

Dr. GRANVILLE BANTOCK read a paper IN DEFENCE OF THE PESSARY.* *Vide* p. 17.

Professor MURDOCH CAMERON said he had listened with great interest and pleasure to Dr. Bantock's paper. He believed in pessaries when properly used. He disapproved of the pessary Dr. Bantock had shown for cases of cystocele. He was certain that in many cases it would act as a guillotine on the cervix. He preferred a boat-shaped pessary for cystocele. He sometimes used a 2¼ in. intra-uterine stem pessary along with a Hodge in the vagina.

Professor SIMPSON expressed the Society's gratitude to Dr. Bantock for coming and giving them such an excellent paper. One was prepared to expect the position which Dr. Bantock would take up and he would say at once that he sympathised very strongly with him in the general trend of his paper. He wished to point out that Dr. Bantock had laid stress on the fact that for success with a pessary the retroversion must be uncomplicated, but the uncomplicated posterior displacements were not so very frequent. He preferred vulcanite pessaries to those made of Britannia metal. Dr. Bantock had said there was no danger whatever in the use of a pessary, but he admitted it had to be applied with skill and only in suitable cases. That held good with every line of treatment and applied to the operations which were carried out as substitutes for pessaries. There was no doubt that there were many cases in which surgical interference was justifiable. There was room for discussion on both sides, and one

must not, on the one hand, denounce operative procedures, or, on the other, declare that the pessary was a useless thing.

Dr. BERRY HART thought that Dr. Bantock had taken up the extreme position with regard to the use of pessaries and had rather exaggerated their good points. Dr. Hart thought there was a certain field for pessaries, but in future operations, especially those on the round ligaments, would be more and more adopted.

Professor KYNOCH thought that with regard to the use of pessaries two things were essential: (1) a correct diagnosis of the condition and (2) an intelligent idea as to the mechanism of the pessary. He had not used pessaries for forward displacements, but he had found them useful in some cases of backward displacements. With regard to operative interference the permanent results had not been very satisfactory and this he attributed to the fact that the patients had mostly been women whose work entailed much standing, mill-workers, etc. They had not sufficient rest after operation.

Dr. BARBOUR said that in his experience the pessary did keep the uterus in position, but in the majority of cases the uterus returned to its abnormal position whenever the pessary was removed. He thought the reason was that the pessary did not act upon the fundus but only on the cervix. Much was to be said for operations in cases where patients could not tolerate a pessary, or where the pessary failed or where the pessary was contra-indicated for some other reason.

Dr. J. W. BALLANTYNE said he could look back on cures effected by the pessary and also on cases which he could not have cured except by operation. He also pointed out the importance of thorough examination of the pelvis, as complications might exist and the symptoms not be due to the displacement at all. Where pessaries were necessary they were not necessarily evil.

Dr. HAULTAIN said that as far as the treatment of uncomplicated retroversion was concerned the Edinburgh School was at one with Dr. Bantock. It was different with retroflexion. A vaginal pessary was then of no use—or at most only in about 15 per cent. of cases was it of any avail—and further operative treatment was necessary. The risk was small and the shortening of the round ligaments was quite a satisfactory operation.

Dr. JAMES RITCHIE said it was important to note whether the retroversion was causing symptoms. If not, then no pessary was necessary.

Dr. HAIG FERGUSON thought that Dr. Bantock had not sufficiently pointed out some dangers from the use of the pessary. It was possible to push the uterus too high up and the broad ligaments became stretched. The patient should never attempt to replace a pessary. If a displacement was causing symptoms the patient should be placed in the recumbent position, and if this relieved her then a pessary should be introduced. If the pessary treatment failed then operative measures should be carried out. He felt that *uncomplicated* retroversion seldom caused symptoms, and therefore seldom required treatment. In some cases of prolapse he had found Napier's modification of the cutter pessary most useful.

Dr. GEORGE HUNTER said he had no fear of the sound and introduced a pessary over the handle of the sound which was keeping the uterus in position. He did not care for metal pessaries becauce they induced galvanic action.

The PRESIDENT thanked Dr. Bantock very heartily for his interesting paper, and expressed the hope that he would return to them with another communication. He agreed that there was no danger in a properly adjusted pessary, but his objection to pessaries was that one could never say how long a patient might have to wear one. This indefiniteness made treatment by pessary compare unfavourably with treatment by operation. The patient ought to be allowed to choose. After operating on over 100 cases he found that in only 5 per cent. was there any recurrence of retroversion.

Dr. BANTOCK replied, and thanked the Society for the kind reception they had given him.

REVIEWS OF RECENT BOOKS.

THE PRINCIPLES AND PRACTICE OF GYNÆCOLOGY. By E. C. Dudley. Fourth Edition. London: Henry Kimpton, 1904.

The fourth edition of this handsome text-book maintains the high standard reached by previous editions. Many sections of the book have been revised and to a considerable extent re-written in accordance with latter-day views.

We are very glad to note the strong advocacy the author makes for the use of rubber gloves, not only for use during operations but also for purposes of vaginal examination. We look forward to the time when such a use of gloves shall become universal both for the patient's sake, and for the protection they afford against the accidental inoculation of specific disease in the course of out-patient practice. The sections on minor gynæcological disorders and operations are well and fully written.

Turning to the chapters on diseases of the tubes we note that they are fully dealt with, and we are glad to find that Dr. Dudley does not recommend indiscriminate removal of the uterus with the appendages in cases of salpingitis. A section is devoted to conservative operations on the Fallopian tubes. The author, whilst generally upholding the principle of conservatism, adds a note of warning against establishing an artificial ostium between an atresic tube and the peritoneal cavity unless the aseptic condition of the tubal mucous membrane can be assured beforehand.

The subject of uterine myomata is adequately treated and the technique of the operative measures carried out for their removal is dealt with minutely.

We think that a little greater detail concerning the pathology of tubal gestation would have been an advantage, the more recently ascertained facts concerning the site of embedding of the tubal ovum having escaped notice altogether; nor do we agree with the author concerning the sphere of usefulness claimed for uterine massage in dysmenorrhœa due to anteflexion.

The general appearance of the book and the many handsome and instructive illustrations reflect credit upon the author and cannot fail to enhance its value in the eyes of the advanced student, to whom we commend it.